Governmentalities of climate change education in England perspectives from history, policy and position-holders

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Governmentalities of Climate Change Education in England: Perspectives from History, Policy and Position-holders

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Doctoral research could be described as the most and least independent endeavour one can undertake. I have loved it, but it has only been possible with the support and input of many other people. So, I submit this thesis with sincere thanks to my research participants for your interest in this research and for generously sharing your views with me. Colossal thanks go to my supervisors, Dr Heather King and Dr Melissa Glackin. Your wisdom, pragmatism and kindness has made this a remarkable and enjoyable learning process. I sincerely hope that we can continue to work together and do good things. To my partner and co-adventurer, Brendan Hills, I am enormously grateful for your support as I have embarked upon this adventure of ideas. It certainly was not in our plan. To my family in Australia, your encouragement and enthusiasm for this undertaking has been cherished and genuinely helpful. Finally, I am grateful for the funding provided by the Rosalind Driver Scholarship Fund over the past three years, without which, this research would not have happened.

Abstract

Recent civil action in England, and internationally, has called for more climate change education. Such calls for 'more' might well be met with the retort 'of what?', for as scholars have recognised, there is little consensus on what climate change education entails. Meanwhile, research gaps exist when it comes to understanding nation-level policy responses to climate change education. Responding to such gaps and appeals, this thesis presents an examination of the climate change education policy landscape in England and offers new insight into *how* the current situation has come to be, such that progress might be made.

The research, which is theoretically framed by Foucault's concept of governmentalities and his analytical instruments of policy historiography and policy archaeology, sets out to examine the rules that govern climate change education in England. It submits *a* history of the present of climate change education in England, exploring political events and transformations since the emergence of environmental education in the 1960s; a period coinciding with a 'climate as catastrophe' discourse. As the climate crisis has intensified, climate change education has been left floundering. It then examines the present-day perspectives on climate change education evident in policy texts and shared by 'position-holders'. Using qualitative, interpretive research methods, specifically, exploratory interviews and thematic analysis, the research explores why some perspectives have come to shape climate change education policy in England, and why some influential people and stakeholders have not seen their role as one of doing so.

At a time when public interest in climate change education is high and it is apparent that the efforts of society and its institutions are failing to ameliorate climate change, the thesis provides valuable new insight. It has found that climate change education has a low profile throughout England's policy landscape within policy texts and amongst individuals in positions of potential influence in relation to it. It has unpacked the complexity associated with defining what climate change education is and developed proposals for how that complexity could be embraced in designing and evaluating climate change education policy. It has also elicited that, whilst there is widespread agreement amongst position-holders that education has a meaningful role to play in response to climate change, there is limited evidence that key stakeholders are 'stepping up' in relation to it and, instead they are 'standing

back’ from influence. Whilst the stances adopted by individuals and the priorities of policy texts could be justifiable when viewed individually, when considered collectively, the situation is more troubling. Not only is climate change education marginalised, but there is also little within the policy landscape to suggest that this is likely to change. Hence, the thesis is concluded by proposing several pathways for action such that education would be positioned to play a more meaningful role in society’s efforts to avert a climate catastrophe. In particular, it is suggested that more policy influence could be realised by viewing ‘influence’ through an ‘activism’ lens.

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Chapter 1. Introduction: Education amidst the climate catastrophe

Recent civil action around the world has brought climate change education into the spotlight. In the UK, student activists have demanded that the UK Government 'save the future', 'teach the future', 'tell the future' and 'empower the future' (UK Student Climate Network, 2020). Meanwhile, research (Steentjes et al., 2020) has found that, amongst the British public, climate change is perceived to be the second most important issue that the UK faces after Brexit, and that there are 'high levels' of concern for, and willingness to support, climate change responses. The immense economic and social impacts of the global COVID-19 pandemic have been recognised as a window of opportunity for a 'green new deal', nationally and internationally, one that supports rather than threatens life on Earth (Monbiot, 2020). This confluence of findings and events suggests that there is both appetite and opportunity for the introduction of climate change centred curriculum or education programmes and that research effort would be well-spent exploring what they should be. Yet, since the early days of environmental education in the 1960s and alongside the escalating climate crisis, multiple waves of climate change-related policy and practice have been initiated. Arguably, society's efforts, including those through education, have so far proven unsuccessful in ameliorating the problem. Given the reasons for this failure are undoubtedly highly complex, future interventions are likely to result in similar outcomes if the factors contributing to that failure are not better understood. This research seeks to identify these factors with a focus on one country context, that of England. Viewing England's climate change education policy landscape through a Foucauldian lens, I examine the factors at play in the lack of progress, that is, the 'governmentalities' of climate change education are the focus for this study (Foucault, 1972, 1991a).

This chapter sets the scene for the research. I begin by describing the research field, the research gap and how I came to be interested in this. This is followed by an overview of the research, first by introducing the theoretical framework and then, by explaining the research design. The final section of the chapter outlines the thesis structure.

1.1 Framing the Research

1.1.1 "Climate as catastrophe"

Historiographers of climate change have shown that since the first ideas of *klima* were articulated in Greek philosophy, there has not been a universal or consistent understanding of the concept of climate and latterly, of climate *change* across societies (Adamson, 2015; Behringer, 1999; Carey, 2012; Heymann, 2010; Hulme, 2008, 2015; von Storch & Stehr, 2000). Ideas and discourses of climate and explanations for changes in it, including the role of humans within these processes, have shifted. These shifts have occurred alongside science and technology developments and in keeping with cultural, political, spiritual and institutional transformations (Hajer, 1995). For example, Hulme (2008) describes early discourses of climate and extreme weather as rooted in a fear of unknown causes and associated with God's judgement or witchcraft. This was followed by discourse 'pathologising' climate by ascribing it with physical and moral dimensions, for example, conveying that tropical climates are dangerous. This 'climate as pathology' discourse correlated with the Imperialist expansion and the Enlightenment and was rooted in a fear of unknown places. In more recent decades and particularly since the 1980s, ideas of climate have been dominated by anthropogenic climate change and associated with a 'climate as catastrophe' discourse (Hulme, 2008, 2015, 2017). This discourse features an understanding of climate as changeable because of human activity, manageable by human intervention, particularly by controlling global temperature (Hulme, 2015), and rooted in a fear of unknown futures.

Arguably, a 'climate as catastrophe' discourse reverberated within the environmental education literature prior to the recent intensification of public calls for 'more!' climate change education. Depictions of the future are grim: of "runaway climate change lurch(ing) forward" (Selby & Kagawa, 2010, p. 41) and of a "creeping emergency" (Kagawa, 2009, p. 116). Jickling describes the future as "bleak, perhaps, even catastrophic" (2013, p. 162). Among such ominous forecasts, scholars describe education as at a critical juncture relative to climate change: of conforming with and reproducing the status quo, or of challenging dominant discourses, conventional thinking and social norms (Jickling, 2016, 2017; Kagawa & Selby, 2010). Choosing the more affirmative path, Kagawa and Selby call for taking climate change as a "learning moment" that "can be seized to think about what really

and profoundly matters, to collectively envision a better future, and then to become practical visionaries in realizing that future" (2013b, p. 4). However, despite the impending threat and these entreaties to act, Sterling (2017) asserts that, so far, education has largely ignored the crisis. Since the early days of environmental education in 1960s, the climate catastrophe has intensified to the point that the future of the planet, and its inhabitants, is at risk. This research is aimed at shedding new light on factors that could be preventing education from a more meaningful response.

1.1.2 Environmental education; climate change education

Several distinctions were made to frame the research field, which I will now explain. First, I approached the research through the environmental education research field, as a sub-field of education research. Approaching this research from alternative fields, such as climate change science, or from science or geography education research, would most likely have produced different results. Moreover, I refer to the broad field (encompassing research, policy and practice) as 'environmental education' rather than, for instance, Education for Sustainable Development (ESD). In doing so, I acknowledge the extensive history of debate concerning the terminology and framing of 'environment-related education' (Hart, 2003) (see, for example: Bengtsson & Östman, 2013; Blum et al., 2013; Ferreira, 2009; Jickling, 1992). Further, and as I discuss in Chapters 3 and 4, I acknowledge that ESD has dominated policy and practice during the 2010s (Berryman & Sauvé, 2016; Blum & Husbands, 2009; Læssøe, Schanck, et al., 2009). Framing the broader field as 'environmental education' makes explicit my position that there is a need to privilege the environment in education and climate change discourse, a view informed by Kopnina's argument (2012) that pro-environmental citizenry is essential in order to respond to the growing environmental crisis.

Second, I conceived of 'climate change education' as a sub-field or approach within environmental education and made this my research focus. As this research will reveal, climate change education is a complex, contested and potentially elusive concept. Indeed, Laessoe and colleagues have characterised it as "hyper-complex" (Læssøe, Schanck et al., 2009, p. 10) in the way that it combines two independently complex concepts - education and climate change - into a third concept that is open to interpretation. Despite this complexity, or perhaps because of it, I considered the

distinction to be necessary. Resonant with the demands from the 2018-20 civil action, I contend that the urgency of the climate crisis demands an explicit response from education that has so far been found wanting at national and international levels (Reid, 2019a). Indeed, the likely climate change impacts and interrelated environmental, social and economic challenges could make climate change education a tangible and mobilising force for accelerating the process of rethinking education (Læssøe, Schnack et al., 2009). Differentiating climate change education from other sub-fields or approaches to environmental education (e.g. Sustainability Education, Education for Sustainable Development or Climate Change Education for Sustainable Development) unshackles it from particular agendas, specifically from globalising agendas of sustainable (and economic) development, thus allowing it to fulfil a "larger sense of purpose" (Reed, 2013, p. 146). Some have argued that it could provide educators and students with an expansive framework for thinking about the future in a way that connects education, community transformation and environment (Reed, 2013; Selby & Kagawa, 2010). That said, at times, discussions of climate change education in the research literature overlap with other approaches and so I draw from literature that adopts different terms. Where necessary to maintain authors' intent, I adopt the terms used by them.

Third, I narrowed the research focus to school-based education. Whilst climate change-related education encompasses a range of educational settings (compulsory primary and secondary school, pre- and post-compulsory schooling, tertiary education, formal, informal and non-formal), the starting point for this research was England's formal education system as pertaining to primary (5-11 years, Key Stages 1 and 2) and secondary (11-16 years, Key Stages 3 and 4) schools. This decision reflects the central role that formal schooling has in contemporary policy and discussions concerning education.

1.1.3 Policy and policy influencers' perspectives on climate change education in England

The literature recognises several climate change education-related research gaps, not least of which is the lack of climate change education research in environmental education and education research, a matter of increasing concern given the urgency of the climate crisis (Henderson et al., 2017; Stevenson et al., 2012). Reid frames climate change education research as "the need of the hour"

(2019a, p. 767), drawing attention to contestation related to the conceptualisations of climate change education, the determination and management of quality, developing educators' practice, and understanding outcomes and evaluation. Elsewhere (2019b), he documents 29 questions, from 'niche considerations' to 'fundamental topics' for consideration, several of which are explored in this research:

- "Why has this particular form of climate change education come into being?"
- "Should the focus be on what influences climate change education the most, who asserts what, who argues X, Y, Z … or something other?"
- "What is said, and what can and cannot be said about climate change education?"
- "How is climate change education limited?" (2019b, pp. 973–974)

Meanwhile, Henderson and colleagues describe that the relative silence on climate change education within the broader educational research field as "a form of organized denial" (2017, p. 413) that avoids the idea that there is a need for dramatic changes in modern lifestyles and social structures. Thus, they collated 23 questions worthy of exploration, organised according to different fields of 'educational inquiry' (i.e. school design, learning, higher education, education policy, curriculum and pedagogy, social justice education). Several of their questions are also explored in this research:

- "Are current institutional structures capable of addressing the totality of the climate change phenomenon?"
- "How is climate change represented in educational policy documents and across various governance scales?"
- "What political conditions shape resistance/acceptance toward climate change education policy?"
- "How is climate change represented in curriculum documents and in pedagogical implementation?" (Henderson et al., 2017, p. 421)

These lists that have emerged from scrutiny of the research literature and collaboration within environmental education and broader education research fields, are indicative of broad and deep research needs relating to climate change education.

Of central concern for this research, and reflected in these lists and elsewhere, are the calls for more policy research. As the climate crisis intensifies, Læssøe, Feinstein and Blum (2013) argue that policy-makers are likely to place increasing attention upon education to help society address climate change, thus they entreat researchers to be ready to respond. Aikens, McKenzie and Vaughter (2016) have also identified a gap concerning "climate change and education policy" (2016, p. 350). Their systematic review of methodological and thematic trends in sustainability education policy research literature (spanning four decades and 71 countries) identified an emphasis on non-empirical studies (e.g. descriptive reports of projects or programmes and discussions of policy discourse with undefined research methods) and that there was a need for more empirical studies of "policy origins and enactment" (2016, p. 352). Elsewhere, Monroe and colleagues have identified a need for more understanding of how nations are addressing climate change (Monroe et al., 2017). Thus, this research is a 'stake in the ground' that critically documents the climate change education policy landscape in England. It builds upon previous historical accounts and policy analyses of environment and climate change related education (Gough, 2013; Læssøe, Schnack et al., 2009; Læssøe & Mochizuki, 2015; Sauvé et al., 2007; Stevenson, 2007). In so doing, it adds to previous examinations of environmental education in the UK and England (Blum & Husbands, 2009; Glackin & King, 2020; Goodson, 1993; Harris, 1991; Martin et al., 2015), thereby contributing a contemporary critique in light of the climate crisis. The main focus is on England, rather than the United Kingdom as a whole, thus acknowledging the devolved responsibility for education across the UK's four countries.

In addition to the policy research gap, this research also responds to identified gaps concerning perspectives, or 'worldviews', of environment- and climate change-related education. Regarding which, following their examination of future trends in environmental education research, Ardoin, Clark and Kelsey (2013) concluded that 'worldviews and belief systems' and 'language and discourse' were understudied areas. González-Gaudiano and Meira-Cartea (2010) have also advocated for examining how beliefs guide action concerning climate change education. Beyond the environmental education literature, opportunities for investigating perspectives have similarly been highlighted. For instance, Carey (2012) has posited that, whilst research attention has been directed towards

defending arguments about the causes and consequences of climate change, the interplay between worldviews on climate change and social contexts has been left underexplored. To address this, the author called for more social histories and cultural analyses of climate change to illuminate how people respond to the phenomenon and how social relations, power dynamics, and ideas affect those responses. In relation to policy studies, Francis (2015) has claimed that less attention has been paid to examining discourses of individuals and organisations than to the discourses of policy texts in general. Accordingly, an important element of this research are the underexplored perspectives of *potential* policy influencers, that is, the views of individuals who are in positions of influence regarding climate change education, whether they acknowledge their own influence or not. My interest in this group relates to my own professional background as an environmental education 'policymaker', 'policy-influencer' and practitioner. Having worked in government and non-government environmental education-related roles over many years, achieving 'success' relative to programme or policy objectives, I was troubled by a sense that my contributions and that of the programmes, organisations or systems I worked within were inadequate in the face of the climate crisis. I wanted to understand why.

In sum, this research responds to a need for new nation-level contributions concerning climate change education policy and policy influence. Drawing on Van Poeck and Lysgaard, instead of setting out to identify the 'best' policy solutions, this research is aimed at examining "the complex underlying factors that influence which policies may be developed, emulated, passed on, or passed over" (2016, p. 307). The key contribution comprises the insights it affords into the status of climate change education in England and how this insight, particularly that concerning policy influence, might support progress to be made in education in the context of a climate crisis.

1.2 Research overview

As indicated already, this research has been motivated by my desire to understand why society's progress on climate change amelioration has proven so elusive. It starts with the hypothesis that the current state of climate change education in policy is inadequate and that the reasons for this inadequacy are not

fully understood. This section introduces the theoretical framework and research methods that I used to explore these problems.

1.2.1 Theoretical framework: the 'governmentalities' of climate change education

The research is framed by concepts originating in the philosophy of Michel Foucault (Foucault, 1972, 1980c, 1980b, 1991c, 1991a, 1991b; Gordon, 1991) and Foucauldian-based concepts that have been developed theoretically and empirically by researchers in the fields of education and environmental education policy sociology (Ball, 1993; Ferreira, 2009; Gale, 2001; Scheurich, 1994). Of central concern is *how* climate change education in England has come to be the way it is, which is distinct from an emphasis on *what* climate change education is, or *what works*. Ferreira (2009) explains that concentrating on *how* sheds new light on climate change education as a 'problem', such that we might be able to think differently about addressing it. In Foucauldian terms, questions of *how* relate to concepts of 'governing' and 'governmentalities', that is, to "the rules of [policy] formation" (Foucault, 1972, p. 207) that make particular problems or solutions visible or sayable, whilst leaving others silenced. In this case, interest lies in the conditions (past and present) that have regulated the climate change education policy landscape in England, thereby making climate change education what it is today.

The research design has been informed by Foucauldian methodological discussions of policy archaeology (Foucault, 1972, 1991b), policy historiography (Foucault, 1980b, 1991c, 1991b) and interpretations thereof (Dean, 2009b; Ferreira, 2009; Gale, 2001; Scheurich, 1994). As a policy archaeology, the research seeks to explore the conditions or events within the policy landscape that make some views, events or actions related to climate change education possible over others. As a policy historiography, the research is interested in the historical transformations that continue to govern climate change education in the 'present'. Within this theoretical frame, an understanding of policy as discourse and as text is adopted, informed primarily by the work of Ball and colleagues (Ball, 1993; Maguire et al., 2015). That is, policies are understood as discursive in the ways that they generate and reproduce discourses as they are enacted. In addition, policy texts *do* matter: they intervene in society and in practice in various ways and function as part of the 'governmental apparatus' (Foucault, 1980c). Thus, the research involves a 'storying' (Gale, 2001,

p. 384) of climate change education policy that explores and problematises how climate change education has emerged, who the actors are and the "conditions, assumptions, forces" (Scheurich, 1994, p. 300) that regulate the field and those within it.

1.2.2 Research design

This research weaves together an exploration of historical events and transformations, views from the literature, and contemporary perspectives of policy and policy influencers to explore the 'governmentalities' of climate change education. It is guided by four research questions:

1. How is climate change education positioned in England's policy landscape, as evident in policy texts and shared by 'position-holders'?
2. Who is influencing climate change education in England and how is that influence being wielded?
3. What factors are 'governing' climate change education in England?
4. What insight does this research offer for the future of climate change education in England?

The first component of the research is an historical account of climate change education that explores 'political' transformations (where 'political' is conceived broadly and unshackled from party politics) from the fields of education, climate change and environmental education. This historical narrative draws inspiration from Foucault's policy historiography, or 'history of the present', to explore how climate change education has come to be as it is in England. Ferreira (2013) terms this as *diagnosing* the present.

The historical account is followed by an empirical study informed by the concept of 'policy archaeology'. The aim is to establish an 'architecture of policy positions' (Gale, 2001) concerned with illuminating what the perspectives are, more so than critiquing who holds them. I examine perspectives of climate change education, as reflected in policy texts and shared by people in positions of influence relative to pertinent policy; people who, as I explain in Chapter 5, I came to refer to as 'position-holders' (Powell et al., 2017). Qualitative exploratory research methods are applied to explore policy and position-holders' perspectives. Specifically, data was generated through exploratory interviews inspired by Oppenheim (2000), and

the analysis was guided by Braun and Clarke's descriptions of thematic and reflexive thematic analysis (2006, 2019). When viewed through a Foucauldian lens, the empirical study, coupled with the historical account and views from the literature, enables me to make claims about the rules and regularities that are governing educational responses to climate change in England, or the 'governmentalities' of climate change education.

1.3 Structure of the thesis

The thesis unfolds in three parts: literature review, empirical study and discussion. The literature review, beginning in Chapter 2, theoretically frames the research. I discuss Foucauldian ideas and unpack key concepts that inform the research design and methods. This theoretical discussion is followed in Chapter 3, with an historical account of climate change education in England. The chapter opens in the 1960s, around the time of the emergence of the field of environmental education (Berryman & Sauvé, 2013; Gough, 2013; Stevenson et al., 2012), a period that, as explained earlier, was associated Hulme's (2008) characterisation of a 'climate as catastrophe' discourse. I chart 'political' developments concerning climate change, education and environmental education through to the recent period of political turmoil in England that has been punctuated by climate activism, Brexit and most recently, the COVID-19 pandemic. By so doing, I identify common threads and transformations over the period of interest. The final part of the literature review, Chapter 4, homes in on recent perspectives on climate change education found in the environmental education research literature. Drawing from that literature, I propose six requirements for a meaningful educational response to climate change.

The second part of the thesis concerns the empirical study. The methodology and methods are described in Chapter 5 and the findings are presented in the subsequent three chapters. Chapter 6 reports on the policy analysis, whilst Chapter 7 probes the research participants' perspectives of what climate change education should be. Together these chapters seek to address Research Question 1 (RQ1). The third findings chapter, Chapter 8, examines the nature of influence in the climate change education policy landscape, which informs RQ2.

The final chapter of the thesis, Chapter 9, draws all the threads together. This discussion chapter begins by directly addressing the first two research questions. It

then weaves together threads from the findings chapters and the three elements of the literature review (the Foucauldian theoretical lens, the historical account, and the perspectives from the literature) to address RQ3. In so doing, it explores the 'governmentalities' of climate change education thereby offering fresh insight into how the current situation has come to be. As is common with policy archaeology, this section draws attention to numerous difficulties and problems, hence, turning to RQ4, the chapter seeks to make progress beyond the current unsatisfactory situation. Accordingly, I discuss changes within the policy landscape that could support the emergence of a more meaningful educational response to climate change. I conclude the chapter, and the thesis, by discussing key implications arising from the research and highlighting opportunities for further exploration that have been prompted by the study findings.

Chapter 2. Theoretically framing the research

2.1 Introduction

The story of climate change education in England told in this thesis draws on my encounters with the philosophy of Michel Foucault and interpretations of his ideas in the education and environmental education literature. Foucault acknowledges that the diversity of fields he studied and the fragmented nature of his work do not culminate in a "totalitarian theory" (1980e, p. 80) and invites further exploration of his "gadgets" (1980c, p. 65). Accordingly, extending his theorisations to another field of study, this research involves exploring how they enable deeper understanding of climate change education.

This chapter, the first of three comprising my literature review, theoretically frames the research. It begins in Section 2.2, by discussing the concepts of 'governing', 'government' and 'governmentalities', which, as the thesis title indicates, are central to the research aims. Section 2.3 explores Foucauldian methodological ideas, focusing on 'policy archaeology' and 'policy historiography', whilst also explaining the ways in which they provide appropriate lenses for exploring *how* climate change education has come to be positioned as it is. The final section, Section 2.4, moves to a finer level of granularity by discussing concepts associated with the methodologies that are particularly relevant for this research: the 'web of conditions', discourse and discursive patternings, and policy and politics. I clarify how these elements are interpreted and applied in the research and their interrelationships. This theoretical discussion is followed in Chapter 3, by an historical account of climate change education and in Chapter 4, by a review of recent perspectives from the environmental education literature on what climate change education should be. Together, these chapters establish the theoretical, historical and research literature context for the empirical research that follows.

2.2 Key concepts: governing, government and governmentalities

The central objective of this research is to understand how the current situation for climate change education has come to be, such that we might be able to do something differently. The Foucauldian notions of 'governing', 'government' and 'governmentalities' (Foucault, 1991a), and interpretations thereof by various scholars (Dean, 2009; Ferreira, 2009; Gordon, 1991), provide useful conceptual

frames to support these research aims. First, regarding 'governing', this concerns how people govern themselves and others, that is, *how* activities and ideas shape or affect conduct or behaviours in various ways working through various people. Gordon refers to governing as "the conduct of conduct" (1991, p. 2). Second, is 'government', which concerns the act of governing. In a Foucauldian sense, 'government*'* not only concerns things that are done by the state, for it also covers a broad ensemble of individuals and institutions, as well as processes, analyses and reflections that allow complex forms of power to operate (Foucault, 1991a). Third, is 'governmentalities', which relates to how we think about governing, that is, our "'mentalities' or thoughts about how we govern ourselves and how we govern others" (Ferreira, 2009, p. 611). Governmentalities concern the thoughts or 'mentalities' of individuals, the 'mentalities' of bodies of knowledge, beliefs and opinions, and the 'mentalities' of the procedures and structures that we are immersed in. Collectively, these mechanisms amount to 'mentalities' through which we govern ourselves and which, as Dean (2009b) identifies, are difficult to comprehend from within. Accordingly, this thesis' exploration of the governmentalities of climate change education examines the perspectives of individuals and those captured in policy, documenting what these are and considering how they have come to be. In so doing, *how* climate change education has come to be is the chief concern, more so than *what* climate change education is or should be.

As alluded to already, a Foucauldian analysis of government is not limited to examining the role of "government of the state" or "political forms of government" (Foucault, 1991a, p. 88) that are internal to the state or society and provide conditions in which people govern. Indeed, even though the administrative state has come to be recognised as the prominent form of government and a lot of attention has been focused on its powers and misuses, Foucault argues that the problem of the state is over-valued. He contends that whilst the state plays a governing role, analyses of this can simplify both the functioning of the state and of power, as follows:

> "[the state] does not have this unity, this individuality, this rigorous functionality, nor, to speak frankly, this importance; maybe, after all, the state is no more than a composite reality and a mythicized abstraction, whose importance is a lot more limited than many of us think." (1991a, p. 103).

Rather than focusing on the state as a separate entity, Foucault conceives of a "governmental apparatus" (Foucault, 1991a, p. 96), which includes various mechanisms that "often sustain the state more effectively than its own institutions, enlarging and maximising its effectiveness" (Foucault, 1980c, p. 73). Power functions through the apparatus, rather than in a linear arrangement dominated by individuals or groups, including by the state. Within this apparatus, he viewed power as circulating and functioning in a chain:

> "It is never localised here or there, never in anybody's hands, never appropriated as a commodity or piece of wealth. Power is employed and exercised through a net-like organisation. And not only do individuals circulate between its threads; they are always in the position of simultaneously undergoing and exercising this power. They are not only its insert or consenting target; they are always also the elements of its articulation. In other words, individuals are the vehicles of power, not its points of application." (1980e, p. 98)

This conception views power as ambiguous, dispersed and operating relationally in a complex 'ensemble' of individuals and institutions, in relations and through various mechanisms. Through the Foucauldian lens, power, rather than being a repressive force vested in the state, exists "inside, outside and alongside the state" (Ferreira, 2009, p. 610). As per the following extract, it views power as a productive concept that we are all constantly engaged in:

> "In reality, power in its exercise goes much further, passes through much finer channels, and is much more ambiguous, since each individual has at his [sic] disposal a certain power, and for that very reason can also act as the vehicle for transmitting a wider power." (Foucault, 1980c, p. 72)

Therefore, to understand how power is working to govern climate change education, it is necessary to move beyond the state, to examine the complex relations operating through a dispersed power ensemble. It is those relations that govern by enabling some social problems and policy solutions to be seen, while others are not. It is the effects of those relations, the resulting processes and forces, that govern behaviours and actions over time. Thus, instead of focusing on *who* has power and what their intentions are, an analysis of governmentalities – an 'analytics of

government' (Dean, 2009b) – is concerned with "the *how* of power" (Foucault, 1980e, p. 92). Such an analysis opens to deeper understandings of what the effects of power are or could be. Foucault explains that insight into the "fine channels" (1980c, p. 72) of power operating within the governmental apparatus is what might enable social change:

> "Nothing in society will be changed if the mechanisms of power that function outside, below and alongside the State apparatuses, on a much more minute and everyday level, are not also changed." (Foucault, 1980a, p. 60)

Interpretations of governing as a sinister, uncontrolled force reaching into all aspects of individuals lives (e.g. Scheurich, 1994) might be well-founded in some analyses. However, arguably, the usefulness of governing/governmentalities is more profound than that. In the case of this research, these Foucauldian 'gadgets' offer a conceptual tool for problematising and developing a deeper understanding of the climate change education policy landscape, the 'fine channels' through which power is exercised and thus, the governmentalities of climate change education. This affords insight into how we could proceed.

Having established 'governing' and 'governmentalities' as key concepts framing the research purpose, the next section discusses how Foucault's methodological discussions informed the research approach.

2.3 Methodological concepts guiding the research

This section discusses three of Foucault's methodological ideas – policy archaeology, policy historiography and policy genealogy – and how they have informed this study. Foucault describes his ideas as "instruments of analysis … (enabling) … a topological and geological survey of the battlefield" (1980a, p. 62), yet he does not stipulate how to operationalise them. He leaves that to "those who do the fighting" (ibid.). This section discusses the instruments and interpretations thereof in relation to the theoretical framing of the research, whilst Chapter 5 describes the research methods that they inform.

2.3.1 Policy archaeology

First, policy archaeology, which of the three concepts discussed in this section, most accurately captures the overall intent of the research. Policy

archaeology is a methodology that "puts things in perspective" (Foucault, 1972, p. 153). It is a method of establishing the rules that govern policy formation by "excavating" (Gale, 2001, p. 388) and "archiving" (Foucault, 1972, p. 145) the conditions and events that make some statements or views, events or actions possible over others. Scheurich (1994) interprets it as a methodology to examine the emergence of particular problems and corresponding solutions. Policy archaeology involves exploring how problems enter (or do not) the gaze of society, the state and researchers by identifying the numerous, complex strands and traces that become visible, such that they are labelled a social problem. It examines the rules that govern what is said at a particular time and how events or statements correlate with other previous or concurrent events. To paraphrase Foucault (1991b), it explores what is *sayable* at a given period of time for a given society: what is *conserved* and remains versus what is repressed or censored; what is *remembered* to be valid, debatable, invalid or negligible; what is *reactivated* and valued and reconstituted to play a role; and finally, what is *appropriated* and by whom so as to be institutionalised, defined and conducted. Such explorations are interested in both presences and absences that relate to how phenomena are positioned and understood across time. Gale's somewhat pragmatic synopsis of policy archaeology is well suited to the central concerns of this research:

> "(1) why are some items on the policy agenda (and not others)?; (2) why are some policy actors involved in the production of policy (and not others)? (3) what are the conditions that regulate the patterns of interaction of those involved?" (Gale, 2001, p. 387)

At the commencement of this research, I perceived that a lack of climate change education in England, it not being on the policy agenda, to be a 'problem' that needed addressing. As identified already, this 'problem' has been identified in the research literature (e.g. Reid, 2019a) and has recently risen to prominence in the public domain through civil action on climate change (Glenza et al., 2019; Watts, 2019). Addressing this problem informed by policy archaeology allows for a deep examination of the strands and traces of it, an examination that, as is discussed in Chapter 9, revealed the presence of a less obvious, but potentially more important problem underpinning the current climate change education crisis.

2.3.2 Policy historiography

The history of climate change education was a crucial starting part for this research, both in terms of my experience of the research process and how the research unfolds in the thesis. Resonant with advice in the environmental education literature (Stevenson et al., 2012), as a new researcher, I was keen to understand the history and evolution of the field before exploring and critiquing the contemporary situation. By conceiving of this 'familiarisation' in terms of a Foucauldian policy historiography, what might have been an historical account of events to establish context for the empirical study became a richer analytical process contributing to the thesis' overall argument. This section introduces policy historiography and how it is interpreted in this research.

Policy historiography sits alongside and overlaps with policy archaeology. While both methodologies are interested in governing and how things have come to be, policy archaeology seeks to document the 'rules' that govern, whereas policy historiography concentrates more closely on transformations over time and their governing role in the present. In the case of this research, policy archaeology characterises the overall intent and the focus of the empirical research, whereas policy historiography is a contributing methodology that extends the contemporary perspective to provide deeper insight.

Policy historiography is concerned with policy problems and solutions at different time periods. It is concerned with complexities within accounts of policy, who (and, in this case, what) is advantaged or disadvantaged by the arrangements and, importantly, the transformations between time periods (Gale, 2001). Such historical analyses do more than document the history of innovations or major events, for they offer a "descriptive analysis of the different transformations effected" (Foucault, 1991b, p. 58) and examine the differences between what can be said at one point in time and another. Foucault likens such historical study to a magnifying glass that "mak(es) visible what was previously unseen" (1980b, p. 50). Examining matters that might not previously have been considered significant affords a different understanding of the present that positions it as interconnected with numerous historical processes (Foucault, 1991c). This generates new insight and better understanding, not of where we are, but of how things have come to be and the conditions surrounding the events, more so than the events themselves.

Writing from an education policy research perspective, Gale (2001) describes policy historiography as an historical storying of the present that considers transformations in issues and responses within policy domains, complexities in the accounts of policy, and what these accounts and complexities tell us about the conditions being brought about by the policy. The expression 'history of the present', discussed in the environmental education literature by Ferreira (2013) and applied by Gough (2013), helps to clarify the contribution of this research as policy historiography. Ferreira describes 'history of the present' as a way to "*diagnose* the present … to question how our established ways of knowing and ways of doing have come to be" (2013, p. 63). As such, a 'history of the present' also helps in examining how power works inside and outside of state and non-state political structures as well as the influence of national, institutional, organisational and personal histories on current thinking and practice in different institutions and situations. Ferreira advocates 'history of the present' as a way for environmental educators to 'illuminate the ordinary', question our assumptions, and imagine alternative ways of doing and being. Whilst it might not provide answers, a history of the present offers:

> "an understanding of how we have come to be what we are where we are, and therefore an understanding of how we might become something other than what we are, and do something other than what we do, now and into the future." (Ferreira, 2013, p. 64)

Amidst the climate crisis, it seems more important than ever that we try to understand how we could be doing something other than what we are.

2.3.3 Policy genealogy

The third methodological lens I reflect on here is policy genealogy. This methodology is not central to this research; however, this brief explanation fills out the methodological picture, thereby indicating what lies just out of focus and could form the basis of future contributions.

I understand Foucault's differentiation of 'genealogy' and 'archaeology', and the intersection with 'historiography', as follows. While 'archaeology' focuses on the discourses or rules that govern how a situation has come to be, 'genealogy' considers the applications of those rules, inclusive of their histories, and the localised effects in the field in question, that is, how they come into play (Foucault,

1980e). Dean (2009b) describes genealogy as a complex task to examine how we conduct our lives and the lives of others, and to problematise it. It seeks to work out where fractures and transformations exist within these problematisations and how these consolidate governing regimes. In so doing, it connects with, rather than avoids, the "strangeness of the present" (Dean, 2009b, p. 56). Policy genealogy "connects (what) empirical analyses reveal to concerns that are activated in light of particular contemporary struggles" (Dean, 1994, p. 34) and takes a closer look at relationships between individuals. Gale captures the focus of 'genealogy' as follows:

> "(1) how policies change over time, but it also seeks to determine (2) how the rationality and concerns of policy production might be problematized and (3) how temporary alliances are formed and reformed around conflicting interests in the policy production process." (2001, p. 390)

Policy genealogy, thus, considers the 'problem' at hand by considering individuals and their connections, behaviours and local level enactments, whereas this research is concerned with a system-level understanding. That is, in relation to policy historiography, this research involves examining historical events, institutions and policies, whilst in regard to policy archaeology, it contributes a contemporary analysis of policies and perspectives of individuals in positions of (potential) influence in the context of climate change education. Together, these methodological lenses afford insight into the governmentalities of climate change education.

2.4 Key elements of the methodologies applied in the research

So far, how 'governing' and 'govern*mentalities*' conceptually frame the research, and how Foucault's policy methodologies inform the overall approach to the research have been discussed. The chapter now narrows its focus to consider concepts associated with the methodologies that are central to this 'excavation' of the climate change education policy landscape. Subsection 2.4.1 addresses the concept of 'web of conditions', Subsection 2.4.2 covers discourse and discursive patternings and Subsection 2.4.3 discusses policy and the political. I explain my interpretation of the concepts in relation to the research and how they are interrelated.

2.4.1 Web of conditions

The first element, I refer to as the 'web of conditions'. As mentioned in Section 2.3.1 above, policy archaeology attempts to uncover the conditions or strategies that produce "permanent and solid effects" (Foucault, 1991c, p. 81). That is, the conditions that govern why or how problems, such as climate change education, enter (or do not enter) the gaze of the governing apparatus. Scheurich, adapting Foucault (1972), describes the interrelationships between the conditions as a 'grid of conditions' as follows:

> "The focus is to investigate the intersection or, better, the constitutive grid of conditions, assumptions, forces which make the emergence of a social problem, and its strands and traces, possible – to investigate how a social problem becomes visible as a social problem." (Scheurich, 1994, p. 300)

Amongst Foucault's writing and interpretations thereof, are several similar and somewhat overlapping concepts: there are 'webs', 'grids' and 'systems' of 'conditions', 'strategies' and 'regularities'. In this research, I adopt the phrase 'web of conditions' to simplify the discussion and because I conceive that a 'web' appropriately captures the interconnectivity of conditions, without implying rigidity, uniformity or tangibility that a 'grid' might do.

Not only does the web of conditions govern what problems can enter the gaze, it is also constitutive of effects, that is, it governs how that problem can be perceived or 'what counts' as climate change education. Thus, the web *generates* effects that materialise in institutions and behaviours, such as how people influence climate change education policy. Those institutions and behaviours can equally be understood or rationalised based on that web. Scheurich (1994) describes the web as productive and reproductive, as constituting what is thought and ways of thinking, what is socially visible or credible as well as what is selected and verified as 'real'. Whilst it does not create a material reality, it does affect various problems and solutions concurrently. That is, in this case, this is not just concerning climate change education, for it also enables (or constrains) particular versions of social/educational problems and policy solutions to emerge. Policy solutions that align with the web become probable, whereas those that conflict with it or diverge from it are ruled out or invisible, particularly those that might undermine the social

order. Whilst some individuals or groups are afforded benefits because of the grid and others are marginalised, the web is not created nor controlled by any individual or organisation. The conditions evolve and as such, are relative to particular time periods and societies. They work continuously to set "socially invisible parameters of socially visible, acceptable definitions of [the object in question]" (Scheurich, 1994, p. 306) and in so doing, alternative voices, problems, definitions or solutions are rendered invisible.

For this research, the interest lies in illuminating the web of conditions that is governing climate change education in England. Given the limited policy attention that has been paid to this in recent decades, prior to the wave of activism that occurred in the late 2010s, doing so should provide new insight into how this situation has come to be.

2.4.2 Discourse and discursive patternings

A second aspect of the methodologies that is important for this research, is 'discourse'. Social science research includes numerous interpretations and debates on discourse and discourse analysis (e.g. Anderson & Holloway, 2020; Bacchi, 2000; Fairclough, 1995; Francis, 2015; Potter et al., 1990) amongst which is criticism of researchers for being unclear or inconsistent in their applications. Hence, this section clarifies my interpretation and discusses it relative to the research.

As indicated in Chapter 1, this research was initially framed by Hulme's (2008) exploration of the discourses of climate and climate change and how they have shifted alongside developments in science and technology and as part of cultural and societal transformations. In several respects, Hulme's discourse analysis provided inspiration for this study: in the way that it described the transformations of discourses over time and how one morphs into another, such that the past can be understood as constituent of the present; that understanding and 'knowledge' transforms alongside other social changes and so what counts as 'knowledge' should be questioned and critiqued; that climate discourses, through to the contemporary 'climate as catastrophe' discourse, can be tied to notions of 'fear' (of the unknown, of unknown places, of unknown futures); and whether 'catastrophe' continues adequately to capture the contemporary climate change zeitgeist. As Hulme's work frames discourse differently to this research (that is, Hulme turns to Dryzek's (1997) environmental discourses where discourse is embedded in language), consistent with

the theoretical framework discussed in this chapter, a Foucauldian-inspired interpretation of discourse is adopted instead. This interpretation is also informed by several discussions in the education research literature (Anderson & Holloway, 2020; Ball, 1993; Maguire et al., 2011).

Viewed through a Foucauldian lens, discourses are social practices that frame how the world can be understood and how certain things can come to be known or done: they "form a practice which is articulated upon the other practices" (Foucault, 1991b, p. 70). Anderson and Holloway describe this understanding of discourse in terms of a "field upon which language and concepts are made possible" (2020, p. 13). Extending beyond language and words, this understanding of discourse is captured by Ball as follows:

> "… what can be said, and thought, but also about who can speak, when, where and with what authority. Discourses embody the meaning and use of propositions and words. Thus, certain possibilities for thought are constructed" (Ball, 1993, p. 14).

In terms of the function of discourses, Ball states plainly: "we do not speak a discourse, it speaks us" (Ball, 1993, p. 14). That is to say, discourses constitute rather than represent realities. They engender and constrain what can be recognised and regarded as true, they govern what can enter the gaze and how that thing can be spoken of and by whom. In so doing, they change and limit the scope for thinking otherwise and can redistribute voice "so that it does not matter what some people say or think, only certain voices can be heard as meaningful or authoritative" (Ball, 1993, p. 15). In this way, discourse governs what can be considered to be true or false (Foucault, 1991c).

To understand how discourses work, returns to the discussion of power in Section 2.2 and the idea that power is understood as dispersed and not necessarily held by certain people or groups. Rather, as the following extract describes, power is exercised by discourses:

> "There are manifold relations of power which permeate, characterise and constitute the social body, and these relations of power cannot themselves be established, consolidated nor implemented without the production, accumulation, circulation and functioning of a discourse." (Foucault, 1980e, p. 93)

Through discourses, power regulates the way people talk to each other, our preferences, the practices that are considered valuable and useful, as well as the practices that fall outside this norm. In keeping with the web of conditions, discourses are not controlled by a powerful group or institution, but rather, they are "motivated by political interests, power relations, ideologies, rhetorical positioning" (Anderson & Holloway, 2020, p. 190). In this way, they privilege some knowledge, some ways of thinking as well as some individuals, organisations and ideologies over others. Foucault argues that rather than focusing on ideology, a concept that he considers can be unhelpfully used "in virtual opposition to something else which is supposed to count as truth" (Foucault, 1980d, p. 118), it is more helpful to pay attention to exploring "historically how effects of truth are produced within discourses which in themselves are neither true nor false" (Foucault, 1980d, p. 118). Accordingly, this research does not focus on ideology, but instead, attends to discourse as constituent of the web of conditions governing climate change education.

Foucault's (1991b) interest lies not so much in defining the discourses and their boundary points, but in the transformations of discourses and the interactions and dependencies as part of those transformations. Resonant with Hulme's work, he is concerned with the "enmeshing of a discourse in the historical process" (Foucault, 1980b, p. 38), thereby putting entities in relation to each other across time and place in a continuous evolution. His interests also lie in the interactions and dependencies that exist within discourses (*intra*-discursive dependencies), between discourses (*inter*-discursive dependencies) and between discourses and factors sitting outside of these (*extra*-discursive dependencies). Arguably, the appropriateness of a web, rather than a grid, becomes more apparent as we conceive of the blurriness of the boundaries between discourses, and the complex arrangement that is formed by *intra*- *inter*- and *extra*-discursive interactions, dependencies and transformations.

Returning to the central concepts of the research, discourses can be understood to govern the interactions between entities as they generate meaning and value, enable or constrain ideas and practice as well as establishing rules that govern what can exist, change, or disappear (Foucault, 1991b, p. 63). Through discourse, power acts to govern what counts as truth or knowledge and, as Scheurich describes (1994), certain discourses arise that dominate understandings of phenomena, such that what is incongruent with the dominant discourses does not appear in the social

order. Interpreting the discourses used to describe the world, affords a richer understanding in that it sheds light on the "hitherto silent conditions under which we can think and act politically" (Dean, 2009b, p. 59).

Two further aspects of Foucault's ideas of discourse have methodological implications for this research. The first is that discourses, in the sense just described, are not obvious. Where studies emerging from the field of linguistics might break down systems of language to define discourses, policy archaeology relies on metaphors to 'decipher' discourses. That is, it looks to events, statements or policies as "the points at which discourses are transformed in, through and on the basis of relations of power" (Foucault, 1980c, p. 70). Accordingly, for this research, policy texts (discussed in the next section) are reviewed and perspectives of research participants are investigated to 'decipher' discourses. The second implication concerns the lack of consistency within discourses and that their limits are not clear or easily defined. Thus, Foucault describes "discursive patternings" as "an almost impalpable fringe surrounding things and thought" (Foucault, 1991b, p. 63). I regard the concept of 'discursive patternings' to be better suited to the aims of this exploratory interpretive research than setting out to identify and label specific discourses.

2.4.3 Policy and the political

The third and final part of this section outlines how 'policy' and 'political' are interpreted in this thesis. As Anderson and Holloway remark (2020), like discourse, researchers have been criticised for leaving their conceptions of policy ambiguous and applications vague or inconsistent, and they describe and problematise several of those conceptions. My interpretation of policy and associated with this, the political, follows on from the above discussion of discourse, being inseparable from it.

Consistent with my understanding of discourse, I follow Ball's (1993) conceptualisation of policy as both text and discourse: while policy can be described as a 'thing', it is also a process and outcome. This conception of policy has been developed theoretically and empirically in the broad educational context (Bowe et al., 1992; Maguire et al., 2011, 2015), whilst also being interpreted and applied in the environmental education literature (Aikens et al., 2016; Stevenson, 2013).

Ball describes policies as follows:

> "Policies do not normally tell you what to do; they create circumstances in which the range of options available in deciding what to do are narrowed or changed." (Ball, 1993, p. 12)

They matter as "textual interventions into practice" (Ball, 1993, p. 12) that have significant effects; they seek to restructure, redistribute and disrupt power relations. In so doing, policies change the circumstances in which we work by reflecting upon and shaping frameworks or encoding meaning. Whilst policies are produced by the state, they do not work alone. They sit within the social order and are always changing as they are taken up by readers in context, and as processes that change the circumstances in which we work. They exist within complex social processes and interact with a variety of structures and individuals, that is, they "*enter* rather than simply change power relations" (Ball, 1993, p. 13). In essence, policies are constituted by and constitutive of discursive frames. Thus, paraphrasing Anderson and Holloway (2020), for this research, policy and discourse are understood as mutually shaping each other, where policy constitutes or mobilises discourse, whilst discourse frames, legitimises, construes, and makes possible the conditions for policy, thereby making some interpretations and enactments possible. Whilst it is not possible to predict how the texts will be taken up, the effects they will have or how actors will orient themselves in relation to them, the "process of social, cultural and emotional construction and interpretation" (Maguire et al., 2015, p. 486), that is, the 'social construction' of policy has been researched (e.g. A. Braun et al., 2010; Maguire et al., 2011, 2015). Given this understanding of policy as discourse and text, and that policy is enacted in context, in this research policy texts can be construed as one element of the 'governmental apparatus' constituting the political body that governs climate change education. They can be conceived as 'metaphors' (Foucault, 1980c) to help to decipher discourses. Examining policy texts relating to climate change education will provide insight into the discursive patternings pertaining to the government of such education.

The final clarification I make in this chapter concerns the interpretation of 'political' as adopted for this research. As prefaced in earlier discussions, for this research, a broad conception of 'political' as concerning things that matter, unshackled from party politics is adopted. This concords with Van Poeck and

Östman's description of the 'political' as always relating to "something that matters" (2018, p. 1408). They argue that public involvement in politics comes about when private and public interests are entangled "antagonistically" (ibid.) and matters or issues become political, because of the "irreconcilability between different, entangled private-public interests" (ibid.). Building on this broad concept, a similarly broad understanding is acknowledged for what constitutes political practice. When viewed through a Foucauldian lens (1991b), 'political' can be understood in relation to practices and to discourse. That is to say, political practices change the conditions in which discourses emerge, are inserted and function. Political practice can authorise who can hold a discourse (e.g. that young people can be learners rather than influencers), how that discourse is described (e.g. that the quality of education is understood through performance measurement), where a discourse is located (e.g. that learning occurs in schools, in the curriculum) and where it is known (e.g. that quality is determined by regulatory authorities). It is political practices over time that influence, that transform systems and provide objects (e.g. populations or individuals) for discourses to be hung on or systems to enable analysis (e.g. administrative systems that assess quality) by which concepts can be known. Foucault describes the political body as being constituted by "an extremely complex system of relations", as follows:

> "It's a highly intricate mosaic. … The interesting thing is to ascertain, not what overall project presides over all these developments, but, how, in terms of strategy, the different pieces were set in place." (Foucault, 1980a, p. 62)

Accordingly, in this research not just the object of the investigation is considered, that is, climate change education policy, for the aim is also to 'put things into perspective' by examining policies, events and perspectives from across the political body that relate to such education. This will lead to illumination of the connections within the political body, some of which might not have previously been uncovered, thereby revealing the governmentalities of climate change education in England.

2.5 Summary

This chapter has set out the theoretical framework that guides this research and explained how examining the climate change education policy landscape through a Foucauldian lens supports deeper understanding of how the current

situation has come to be. I conclude the chapter by briefly summarising the concepts that are of central importance to the research.

The chapter began by introducing 'governing' and 'governmentalities' as central to the research aims. That is, the research is set out to explore governmentalities of climate change education in England, thereby generating insight into *how* the current situation has been brought about. This was followed by discussion on the Foucauldian methodological concepts of policy archaeology, policy historiography and policy genealogy and how the former two have framed this research. That is to say, the research seeks to 'excavate' the rules that are governing the policy landscape, and the historical transformations that are constitutive of today. The final section moved to a finer level of granularity by defining key elements arising from the methodologies and how they relate to the research: the web of conditions, discourse and discursive patternings and finally, policy and politics.

Supported by the concepts discussed in this chapter, this research examines what is sayable or not with respect to climate change education and exploring what strands have come together to make it so. The following chapter, Chapter 3, tenders a 'history of the present' of climate change education in England that charts a series of events and transformations related to climate change, education and environmental education that have, arguably, contributed to the current situation.

Chapter 3. A 'history of the present' of climate change education in England

3.1 Introduction

The history of climate change education presented in this chapter considers international and national events in the fields of education, climate change and environmental education. Following Gough (2013), the chapter presents *a* history rather than *the* history of the present of climate change education. Whilst I aim to present a balanced, truthful account of international and national events, the chapter is a selection of those viewed through a theoretical lens, as described in the previous chapter. By being alert to notions of governing and discourse, politics and policy, has enabled me to explore how the present might have come to be.

The chapter joins history in the latter half of the 20th Century as environmental education was emerging alongside a 'climate as catastrophe' discourse (Hulme, 2008). It examines international and national events, policies and politics that could be considered representative of the 'governmental apparatus' (Foucault, 1991a) pertaining to climate change education and constitutive of the context in which it now sits. Arguably, society has reached a point where there is widespread (although, not unanimous) agreement regarding the human causes of climate change, the risks posed to life on Earth because of a changing climate and the need for its amelioration. Such agreement has emerged amongst the international scientific community through the Intergovernmental Panel on Climate Change (IPCC) reports (e.g. 2018b), in the national political landscape, as demonstrated by the UK Parliament's recognition of an environment and climate emergency (UK Parliament, 2019) and amongst attitudes of the British public, as found in research (Steentjes et al., 2020). In an attempt to avoid catastrophe, the IPCC has recognised the need for "ambitious mitigation efforts" (Allen et al., 2018, p. 78) and integrated climate change responses. Yet, irrespective of the recognition of the need to act, so far there has been a failure to do so in a way that might prevent a climate catastrophe from occurring. In terms of education, according to Reid, "it is clear that the provision of climate change education nationally, regionally and internationally is found wanting in many regards" (2019a, p. 770). This chapter's examination of the events that have preceded the current state of climate change education in England, is aimed at shedding new light on how this troubling situation has come to be.

The history unfolds in five parts. It begins, in Section 3.2, by discussing the emergence of environmental education and 'climate catastrophe' in the 1960s - 1980s, whilst Section 3.3 explores the rise of 'sustainability and sustainable development' in the 1980s - 2000s. Section 3.4 considers events from the turn of the new millennium until the early 2010s, paying attention to international and national events that unfolded in relation to climate change and climate change education. Section 3.5 sets the scene for the empirical research that follows, with an outline of the current state of climate change education and a reflection on recent political occurrences that, arguably, are having a bearing on the context in which climate change education sits.

3.2 1960s-1980s: Environmental education and a 'climate catastrophe' emerge

The climate crisis is not new, nor is the reticence to redressing human-caused environmental harm. In 1962, Rachel Carson's *Silent Spring* (1962) raised awareness of the effect of chemicals upon wildlife, people and agriculture in America. Her work was fiercely resisted by members of the political, scientific and academic community. Time Magazine (1962) accused Carson of "putting literary skill second to the task of frightening and arousing her readers" (ibid., no page), with "oversimplifications and downright errors" in an "emotional and inaccurate outburst" (ibid., no page). Somewhat condescendingly, "Miss Carson" was compared with "scientists, physicians, and other technically informed people" and "respected experts of the U.S. Public Health Service" (ibid., no page). Arguably, Carson's work was resisted because she was an outsider. That is, she was a female affiliated with the government rather than the science academy and despite being scientifically trained, she did not have a PhD nor was she engaged in original research (Lear, 1993). There are two reasons why I open with this anecdote. First, because it was an important time for environmental education: *Silent Spring* has been widely acknowledged for bringing science and humanity's impact on the environment out of the academy and to the general public. It is also credited with stimulating the modern environmental education movement, that is, the field from which this research emerges (Gough, 2013; Jickling & Wals, 2008; Lear, 1993; Palmer & Neal, 2003; Scott & Vare, 2018). Second, the resistance that Carson encountered is noteworthy regarding the governmentalities of climate change

education today. That is, it highlights the need to be alert about what is ‘sayable’ about climate change education and by whom as well as which ‘truths’ or realities are enabled or denied.

3.2.1 Changes in climate understanding

The mid-20th century saw significant climate change-related scientific developments, supported by military funding (Heymann, 2010; Weart, 2017). Understandings of climate shifted from a statistical view to one enabled by physical and computer modelling; from a local to a global view; and to global temperature being established as the key parameter of climate research (Heymann, 2010). Higher levels of CO_2 were identified as occurring in the atmosphere and oceans post-industrialisation (Carey, 2012; Heymann, 2010; Weart, 2017). However, this new scientific perspective was accompanied by conflicting predictions of global warming and cooling (Weart, 2010). Developments in science and interest in climate shifted from the impact of climate upon humans to the impact of humans upon climate and discussion extended beyond science to include the populace and politics (Weart, 2017). Concern about the environmental damage being caused by humans was aided by images, such as the 1968 ‘Earthrise’ taken during the Apollo 8 space mission, an image that became symbolic of global political efforts to address environmental problems from the 1970s onwards (Hajer, 1995; Heymann, 2010). Public engagement was coupled with a ‘crisis’ framing of climate, recognised as being related to a growing awareness of and anxiety about, human made risks, coinciding with fears of nuclear conflict in the Cold War (Carey, 2012; Heymann, 2010; Hulme, 2008; Weart, 2017). Hulme (2008) describes the emergence of a ‘climate as catastrophe’ discourse that linked scientific modelling with urgency, alarm and impending chaos, thus forewarning of imminent global catastrophe and associated with increasing public anxiety rooted in a fear of unknown futures. Amidst growing realisation of the limitations of science and technology in solving environmental problems along with calls from the media and scientists for greater public awareness and education about environmental problems, environmental education started to emerge (Gough, 2013).

3.2.2 The emergence of environmental education

Internationally, the timing and location of the first use of the term ‘environmental education’ is contested, although in the UK it was initially recorded at a conference on conservation of the countryside held at the University of Keele in 1965 (Goodson, 1993; Gough, 2013; Palmer & Neal, 2003). Conference delegates agreed that environmental education was essential for all citizens as part of the development of a scientifically literate country, thereby connecting conservation, science and environmental education. There are various accounts of the paths from which environmental education emerged. In England, Rickinson and colleagues’ (2004) discussion of the history of outdoor learning identified foundations in nature studies, field studies, rural studies and urban studies. Goodson (1983) and Harris (1991) described the field’s emergence through rural studies, oriented towards less academically-inclined students in rural areas and as occurring at a time when England’s curriculum was largely locally organised, thus affording teachers notable control and creativity. According to Harris, as rural studies sought a more academic reputation through integration with geography and science, environmental studies courses were spawned. Harris explained how these courses were contested amongst proponents of environmental science and those of geography, history and science, which led to their being rebadged as environmental education. Harris’s account illustrates that environmental education has long lacked a fixed ‘home’ in England, thereby resonating with Berryman and Sauvé’s (2013) assessment of the field’s long-term struggle for legitimacy in formal education settings around the world.

By the late 1960s, environmental education was gaining prominence within formal education in the UK (Harris, 1991; Palmer & Neal, 2003): environmental studies exams were proposed and environmental studies faculties appeared, led by geography, biology or rural studies teachers (Goodson, 1993). There was the growing presence of non-government organisations, such as the National Rural Studies Association (established in 1960, before a name change to the National Association of Environmental Education in 1971 [NAEE, 2017]) and the Council for Environmental Education (founded in 1968 with a focus on learning outside the classroom [Council for Environmental Education, 2004]), which became leaders in the environmental education sector. This leadership by non-government

organisations, rather than government, was later identified by Blum and Husbands (2009) to have become a trait of the sector.

The developments in England correlated with developments elsewhere in the world (Greenall Gough, 1993), including attempts to define the field, such as that of Stapp and colleagues, who defined an education that "effectively educates man (sic) regarding his relationship to the total environment" (1969, p. 30) and Lucas (1972), who sought to unpack the field's terminological and conceptual ambiguity by differentiating types or purposes of environmental education. Lucas illustrated the complexity and interpretability of environmental education by devoting two chapters (out of nine) of his doctoral thesis to clarifying "the environment" (distinguishing urban, family, business, agrarian, cultural, living and architectural environments), before going on to describe a tripartite environmental education typology consisting of:

> "Education about the environment, for the (preservation of the) environment, or in the environment. Combinations of any two or all three of these possibilities are also sensible" (1972, p. 98).

These definitions and descriptions have been the subject of ongoing debate (Ferreira, 2009; Fien, 1993, 2000; Jickling & Spork, 1998; Scott, 2019) and illustrate how researchers have long grappled with conceptualising the purpose of environmental education. Later chapters further discuss the mixed conceptualisations of climate change education that exist today and how they could be hampering efforts to ameliorate climate change.

Internationally, environmental education's growing presence was also evident in UN events and documents. According to Berryman and Sauvé (2013), this presence was accompanied by a legitimising discourse for environmental education that linked prior ideas of "inclusiveness" and "broadness" with crisis, catastrophe and urgency along with a "salvation" or "redemption" narrative. In 1972, with the establishment of the United Nations Environment Programme (UNEP), education and training were acknowledged as essential outcomes of environmental policies (Gough, 2013). In 1976, the *Belgrade Charter* (UNESCO-UNEP, 1976) articulated the goal of environmental education orientated towards both individual and collective action:

> "To develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment *to work individually and collectively* toward solutions of current problems and the prevention of new ones." (1976, p. 2, italics added for emphasis)

The following year, this ambition was adjusted at the Tbilisi UNESCO-UNEP Intergovernmental Conference on Environmental Education. The new statement of goals, objectives and guiding principles for environmental education were as follows:

a) "to *foster clear awareness of, and concern* about, economic, social, political and ecological interdependence in urban and rural areas;
b) to provide every person with *opportunities* to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment;
c) to *create new patterns of behaviour* of individuals, groups and society as a whole towards the environment." (UNESCO, 1977, p. 26, italics added for emphasis)

The emphasis had shifted from action-oriented individual and collective 'work', to softer expressions of 'fostering awareness of, and concern about', 'opportunities to acquire' and 'create patterns of behaviour'. Despite, as Kopnina (2012) notes, the aims of both documents being to educate people as part of global efforts to resolve and prevent environmental problems, Gough (2013) has argued that the *Belgrade Charter* emphasised action and responsibility relative to environmental problems, whereas the *Tbilisi Declaration* incorporated more politically palatable consensus goals: "more as exhortations than specifications" (2013, p. 15). For example, the *Declaration* emphasised the provision of opportunities for citizen involvement through public awareness so as to "enhance a spirit of responsibility and solidarity among nations" (1977a, p. 12), thereby emphasising awareness, rather than action. Alongside this softened tone, the *Declaration* adopted a broad conception of environmental education that acknowledged the field's breadth and complexity through reference to formal and non-formal education as well as being trans-disciplinary. However, its emphasis on science and technology along with its orientation towards cognitive outcomes – to learning <u>about</u> the environment - was

arguably limiting and reinforced an orientation away from advocacy or action for the environment. Furthermore, its emphasis on training for specialist occupations in research and environmental sciences "whose responsibilities bear directly on environmental problems and opportunities" (UNESCO, 1977b, p. 12), arguably, positioned the environment as a problem that needed to be solved by experts, rather than by all. Stevenson's (2013) claim that the shift between the *Belgrade Charter* and the *Tbilisi Declaration* reflected changes in conference attendees from people working in the field to government representatives, is also noteworthy in the context of this research. It highlights how a gap can exist between practitioner and policymaker agendas as well as the lasting impact that can be had by being a voice in the room, or not. It raises questions concerning who has a voice in contemporary policy making relating to climate change education, and which voices and agendas have power or not.

3.2.3 Education changes in England and the marginalisation of environmental education

In the 1980s, according to Ball (2013), school education in England faced growing criticism. The role of teachers and teacher training was being questioned and the absence of a nationally coordinated curriculum, a circumstance that had arguably enabled environmental education to emerge (Harris, 1991), was being criticised for failing to equip students for work. A series of discussion documents, the *Curriculum Matters* series, was published and paved the way for a future curriculum in England. Whilst climate change did not appear in these documents, environmental education did. Geography education was noted as able to make a "significant contribution" to the 'theme' of environmental education (HMI, 1986) by giving students the chance to explore environmental issues. Science was noted as a place to learn about the natural world: "the scientific area of learning and experience is concerned with increasing pupils' knowledge and understanding of the natural world and the world as modified by humans" (HMI, 1985). Additionally, environmental education was identified as one of five cross-curricular issues that schools could include in their curriculum framework within disciplines or as a theme to support aspects of it:

> "Environmental education, which can help pupils to develop an awareness, appreciation and understanding of their surroundings, may be presented

> through science, history and geography, for example, or can act as a unifying approach for work in and out of school in several subjects and curricular areas.” (HMI, 1985)

The environmental education discussion document (HMI, 1989) described environmental education as constituted by four “overlapping components”:

> “Curiosity and awareness about the environment; knowledge and understanding; skills; informed concern.” (HMI, 1989)

For a field that had been seeking legitimacy since the 1960s, this inclusion might have been encouraging, although, in keeping with the tone of the *Tbilisi Declaration*, it was oriented towards learning about, rather than for the environment, being towards concern and awareness, rather than action. Furthermore, environmental education was positioned as non-compulsory, ‘whole curriculum’ and integrated, which, according to Scott and Reid (1998), contributed to a lack of related achievement. Scott and Reid suggest various reasons for this failure amongst which was the contention that, in discipline-dominated models of education, such as that in England, non-compulsory subjects that sit outside of disciplines, even if they are considered to be ‘integrated’, are prone to marginalisation and dismissal from the curriculum.

The *Education Reform Act 1988* ushered in several changes that would have both direct and indirect effects on the provision of environmental education, subsequently leading to ongoing ramifications for climate change education. First, as described by Ball (2013), the *Act* positioned education as a pathway to participation in a market-driven workforce, particularly through the inclusion of vocational and technical training. Second, it introduced the first National Curriculum, which shifted curriculum control from teachers towards the state, under the guidance of a National Curriculum Council. Third, it specified core subjects as mathematics, English and science, six foundation subjects (including geography) and religious education, featuring a daily ‘act of collective worship’ of ‘broadly Christian character’. Ball (2013) contended that the curriculum portrayed misguided notions of English ethnicity and cultural homogeneity in society. Significantly for environmental education, the *Education Reform Act 1988* specified core subjects and omitted cross-curricula priorities, meaning that the aforementioned environmental education

discussion document (HMI, 1989) was stripped of legitimacy before it was published. Martin and colleagues (2015) note that the cross-curricular themes were reinstated owing to lobbying, but they did so in the form of non-statutory guidance. Environmental education had been relegated to the periphery.

3.2.4 An international, institutionalised climate catastrophe

While this transformation of education towards structured, centralised delivery was underway, international events relating to climate change started to position the phenomenon as something governable at a multi-national level, and as an administrative process of governments. In 1988, the Intergovernmental Panel on Climate Change (IPCC) was established by the UN General Assembly to:

> "Provide internationally coordinated scientific assessment of the magnitude, timing and potential environmental and socio-economic impact of climate change and realistic response strategies." (UN General Assembly Resolution 43/53, n.d.)

The assessments came in the form of 'Assessment Reports', the sixth of which is due for release in 2022. The significance of the IPCC reports was evident from the publication of the *First Assessment Report* (IPCC, 1992), which formed the scientific basis for the *United Nations Framework Convention on Climate Change* (*UNFCCC*) (UN, 1992).

The signing of the *UNFCCC*, in 1992, indicated mounting national and international political acceptance of ideas of anthropogenic climate change and the need for action. However, rather than setting out to stop anthropogenic climate change, the *UNFCCC* established an intention to 'manage' it in ways that support humans (food production and economic growth) and requiring natural ecosystems to adapt:

> "… stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system …within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner." (UN, 1992a, Article 2)

Notably, the *UNFCCC* also committed signatories to education as part of their country climate change responses, specifically through Article 6: "Education, Training and Public Awareness" (UN, 1992) (a matter that I return to in Subsection 3.5.1 below and in Chapter 6). In April 1986, "climate catastrophe" or "*klimakatastrophe"* had first appeared in the German cultural magazine *Der Spiegel* (Hulme, 2017; Weingart et al., 2000) and whilst the media continued to report mixed views about whether a changing climate would result in global warming or global cooling, Hulme argued that the signing of the *UNFCCC* marked a normalisation of 'climate as catastrophe' discourse in policy and institutionalised links between anthropogenic climate change and global danger. Climate change had, thus, become a more pronounced fear, understood and interpreted from within a context of globalisation and supported by apocalyptic imagery of drought and melting ice caps.

Meanwhile, in England, Prime Minister Thatcher placed environmental issues, including the threat of global warming, high on the national and international political agenda. First, in a speech to the scientific academy, the Royal Society, Thatcher pronounced:

> "We have unwittingly begun a massive experiment with the system of this planet itself." (Thatcher, 1988, no page)

This speech addressed increasing greenhouse gas emissions, global warming, ozone depletion, pollution, and soil and lake acidification, couched within a commitment to economic growth:

> "The Government espouses the concept of sustainable economic development. Stable prosperity can be achieved throughout the world provided the environment is nurtured and safeguarded. Protecting this balance of nature is therefore one of the great challenges of the late Twentieth Century." (ibid.)

These remarks were closely followed by a speech to the UN General Assembly that recognised anthropogenic causes of climate change and advocated solutions tied to economy by "generat(ing) the wealth required to pay for the protection of the environment" (Thatcher, 1989, no page) and highlighting the role of multi-national industry to "do the research and find the solutions". Thatcher also advocated administering climate change responses via "a framework convention on climate change - a sort of good conduct guide for all nations" (ibid.). Thatcher's speeches,

foreshadowing the *UNFCCC*, displayed an intent towards political leadership concerning the links between human activity, climate change and environmental degradation. They also showed clear alignment with an economic growth agenda. She was criticized for not matching her climate change rhetoric with policy and Vidal reports (2013) that she later retreated from views on the threat posed by climate change, reportedly rejecting Al Gore and his "doomist" predictions. Nevertheless, her public statements allegedly had a mobilising effect on the climate change discourse, the green movement and environmental education, despite environmental education's parallel exclusion from the curriculum (Harris, 1991).

3.3 1980s-2000s: The rise of 'sustainable development'

The 1980s saw the rise of 'sustainability' and 'sustainable development'. Associated discourses overlapped and intersected with the emerging environmental education field and the 'climate catastrophe' in environment - and climate change - related institutions and policies, including those concerning environmental education. Early references to 'sustainable development' were in the *World Conservation Strategy* (IUCN, 1980). Sauvé, Berryman and Brunelle (2007) highlighted how this strategy explored links between economic growth and environmental preservation, between poverty and depletion of natural resources, and afforded education a key role in addressing such issues. It turned environmental education towards education for sustainable development (ESD) (Sauvé et al., 2007; Tilbury, 1995). This pivot was reinforced through reports and strategies, such as *Our Common Future*, commonly referred to as the *Brundtland Report* (Brundtland, 1987). The *Brundtland Report* responded to a UN call for "a global agenda for change" (1987, p. 5), urging world leaders to work together to address the "downward spiral" (1987, p. 6) of the interconnected issues of "poverty, inequality and environmental degradation" (1987, p. 7). Such ideas were then strengthened in the subsequent *World Conservation Strategy* (IUCN/UNEP/WWF, 1991) and in *Agenda 21* (United Nations, 1992), with the latter focusing attention on the world's poorest people and articulating a crisis of "poverty, hunger, ill-health and illiteracy and the continuing deterioration of the ecosystems on which we depend for our well-being" (United Nations, 1992 para 1.1). Education was afforded an instrumental and anthropocentric role in *Agenda 21*, positioned as it was within Section IV: 'Means of Implementation' (United Nations, 1992). Within the education-related chapter of

Section IV (Chapter 36), the first of three programme areas was entitled "Reorienting education towards sustainable development" and the associated 'basis for action' was oriented towards 'human potential':

> "Education, including formal education, public awareness and training should be recognized as a process by which human beings and societies can reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues. While basic education provides the underpinning for any environmental and development education, the latter needs to be incorporated as an essential part of learning." (United Nations, 1992, para 36.3)

As discussed in the previous section, environmental education had only recently emerged and had done so from a range of movements. Whilst environmental education was recognised in UN policies, it lacked a strong presence in the national policy landscape and thus, arguably, it was susceptible to influence, especially by the institutions (and discourses) that were governing the international policy landscape. Therefore, reframing environmental education to ESD in *Agenda 21* and affording it an instrumental role, with anthropocentric rather than eco-centric aims, marked a significant shift for the field. As I will go on to discuss, the shift ultimately resulted in a normalisation of environmental education as ESD, and effectively marginalised alternative framings for environment-related education. For now, I will briefly pause this historical account to reflect on key aspects of discussion related to this shift in the environmental education literature.

3.3.1 Critiques of (education for) sustainable development

Environmental education's shift towards "sustainability/sustainable development" (Sauvé, 2005, p. 29) has been extensively debated in the literature. It has been described as a move that addressed perceived "deficiencies" (Sauvé, 2005, p. 30) of more nature-oriented approaches and as accommodating human and environmental concerns, which, arguably, was overdue (Stevenson, 2006). Advocates, such as Tilbury (1995), viewed the shift as an opportunity to enhance the relevance of environmental education. She argued that, having emerged from diverse movements with differing aims, environmental education had struggled to achieve its goals of environmental improvement and that a shift towards 'sustainability'

(which she termed Environmental Education for Sustainability), was a constructive way for environmental education to consider the social and economic dimensions of environmental problems. According to Tilbury, the concepts of sustainability/sustainable development could capture contemporary issues and a broader context, including consumerism, business and industry as well as examining "interdependence and interactions" between "lifestyles and the use of nature" (Tilbury, 1995, p. 199) thereby addressing issues of equality and justice in society and with nature. The associated curriculum could sit outside of disciplines and enable "education of the 'whole person'" (ibid., p. 200). Others described the potential for sustainability/sustainable development to focus on desirable futures, rather than environmental problems (Gough, 1997; Smyth, 2006; Stevenson, 2012). This shift of focus has been heavily critiqued, and this section addresses some areas of this debate, that, as this research will show, remain pertinent to climate change education in England today.

3.3.1.1 Ambiguity and determinism

The first area of criticism concerns the conceptual ambiguity of sustainability/sustainable development, concepts that have been accused of being "vague and problematic" (Jickling & Wals, 2008, p. 4) and definitionally hazy (Selby & Kagawa, 2010). According to Stables (2013), the ambiguity of sustainability and sustainable development make the concepts weak motivators for addressing their purported goals. Berryman and Sauvé (2013) contend that orienting environmental education towards education for sustainable development, and coupling it with a narrative of inclusivity and 'salvation', associates environmental education with unspecified ends (what would it actually mean for the world to have achieved sustainable development?) and unclear means (how could these ends be achieved?). Moreover, concerns have been raised about education for sustainable development being open to interpretation:

> "… as a blanket term for more or less anything, including the continuation of the status quo, or as a convenient label for new initiatives actually implemented for other reasons." (Læssøe, Schanck et al., 2009, p. 10)

Elsewhere, there are more doubting critiques, for instance, that 'sustainability' "disguise(s) an unsustainability late modern societies neither can, nor really want to,

remove" (Blohdorn, 2002, p. 1). That is, a positive framing of 'sustainability' is being mobilised pro-actively to conceal the inherent *un*sustainability of many modern lifestyles and governing systems, thereby facilitating a continuation of those lifestyles and systems.

Alongside this ambiguity, ESD has been problematised for having "instrumental and deterministic tendencies" (Jickling & Wals, 2008, p. 18), whereby seeking the 'achievement' of sustainable development (whatever that might mean) in education *for* sustainable development merely orients it towards awareness raising, changing attitudes and individual behaviour change. Stevenson and colleagues criticise an ESD orientation as an appropriation of education for "social engineering in which certain decision makers decide how others should behave" (2013, p. 513), thus maintaining the assumption that individual behaviour change will solve environmental problems. Others point to it as not enabling the reflexivity to engender critical thinking (Sauvé et al., 2007) and for overlooking the potential for education to enable human development (Wals, 2011). Whilst Bengtsson (2016) contends that ESD might not be as hegemonic or deterministic as has been claimed and that it requires closer examination within cultural contexts, Berryman and Sauvé (2016) take Bengtsson to task. They argue that Bengtsson's view is, indeed, being limited by the ruling ESD discourse; that his positioning of environmental education as focusing on "environmental protection" (Bengtsson, 2016, p. 79) is 'reductive' and that adopting a perspective of the natural world as a resource reflects and is determined by the ESD framing.

3.3.1.2 Underpinned by economic growth

A second form of criticism concerns the economic discourse attached to sustainable development. Since the release of the *Brundtland Report*, human development has been positioned as contingent upon economic growth, which in turn, has been positioned as necessary for solving environmental problems. Sustainability/sustainable development education has, thus, been criticised for supporting a globalising anthropocentric policy agenda wedded to economic growth (e.g. Berryman & Sauvé, 2016; Kopnina, 2016, 2020; Sauvé et al., 2007). In this context, Kopnina (2020) has argued that pupils are taught social and economic priorities at the expense of ecological ones. Sauvé, Berryman and Brunelle's (2007) discourse analysis of UN documents challenged the assumption that economic

development was necessity rather than optional, that development was analogous with economic growth, and that preservation of healthy ecosystems and economic production were simultaneously achievable. They criticised the positioning of the economy, the environment and education. That is, the economy “as an autonomous entity existing outside of society, rather than a dimension of the social sphere” (2007, p. 49), the environment as a problem and a pool of resources to support development, and education as an instrument for addressing the world’s problems attached to a predetermined pathway of economic development.

3.3.1.3 Diminishment of the natural environment

A third, related, area of criticism concerns sustainability/sustainable development discourses and strategies linking the natural environment and economy in ways that are counterproductive to the aims of environmental education. Kopnina argued that “the *Brundtland Report* effectively gave government agencies, including policy-makers, an excuse to eliminate ‘environment’ from the political lexicon” (2020, p. 2). Despite the relative prominence of environmental concerns during the early days of sustainable development, research has tracked a diminishment of the environment within policies concerning sustainability/sustainable development education (Berryman & Sauvé, 2016; Jickling & Wals, 2008; McKenzie et al., 2015; Stevenson, 2012). For instance, McKenzie and colleagues (2015) examined how sustainability was being paired with economic priorities of neoliberalisation in education policy. They identified a tendency for policies initially to describe sustainability in terms of the commonly evoked model, that is, where the three interrelated components of sustainability - natural environment, society and economy (Sneddon et al., 2006), colloquially referred to as ‘People, Profit and Planet’ (Kopnina, 2020) - are presented in a nested arrangement. In this arrangement, the natural environment is the largest outer circle and the highest order concern, society is the next level in, and economy is the smallest circle as a subset of society. Whilst they found a tendency for policies to begin by prioritising the natural environment within this nested arrangement, this prioritisation was not maintained. They argue that sustainability is being adopted in a way that allows for de-prioritisation of the environment and that it has become a convenient expression to promote different ends, particularly ends perpetuating neoliberal ideas. This tendency is problematic when practitioners, policy makers and policy influencers,

who are embedded within sustainability/sustainable development discourses adopt its language and values. The under-privileging of the natural environment becomes normalised (Kopnina, 2012, 2016) and the environmental crisis that, arguably, is being caused by economic growth being positioned as the driver and solution for modern society (Sauvé et al., 2007; Smyth, 2006), is perpetuated.

Despite the extensive criticism within the environmental education literature, the concepts of sustainability/sustainable development have proven resilient. Stephen Gough contends that they might have become a "comforting distraction from the real issues" (2016, p. 847) for environmental education practitioners and researchers, whilst providing benefit to those who stand to profit from inaction. Further, Gough speculates that perhaps the accessibility of sustainability has enabled it to persist over a long period of time and achieve as much as any other construct might have been able to do. Whatever the case might be, and re-joining this history at the turn of the millennium, ESD gained a strong profile in England that framed the next decade (plus) of environment-related education.

3.3.2 The turn towards education for sustainable development in England

The turn towards ESD in England coincided with the installation of the New Labour government in 1997. According to Ball (2013), education was positioned prominently as part of the government's pursuit of an information and services economy. Simultaneously, New Labour pursued a cross-departmental approach to put "sustainable development at the heart of every government department's work" (DETR, 1999, para. 5.2; in Jackson, 2010); ESD became centre stage.

Examining environmental policy under New Labour, Jackson (2010) writes that multiple ministries undertook concurrent activities and initiatives related to sustainability/sustainable development. The Department of Education and Employment and the Department of Environment established the Sustainable Development Education Panel (SDEP) (Martin et al., 2015), which indicated an alliance between the two ministries. However, Jackson contended that New Labour's achievements were impeded by a lack of integration across ministries, alongside inconsistent or otherwise deficient approaches to appraising the effectiveness of initiatives and a failure to develop suitable cross-government expertise to do so.

Meanwhile, the Department for Education and Employment was recognised as having a "crucial role to play in leading and creating the climate for change" (Secretary of State for Education and Employment, 1997, p. 32), a play on words that perhaps indicates that the phenomenon had entered political rhetoric. Blum and Husbands (2009) noted that, whilst climate change did receive attention in education policies, the emphasis was on sustainable development. A study of Hansard (a verbatim record of debate in UK Parliament) by Vare and colleagues (2019) has found that around this time environmental education receded from the record and 'sustainable development education' started to appear, followed later (2003) by 'education for sustainable development'. Yet, conceptions of ESD (and related forms of education) varied in terms of policies (Blum & Husbands, 2009) and were coupled with a lack of educational principles underpinning ESD that, according to Martin and colleagues (2015), could have enabled its more successful integration into mainstream education

Early in the government's term (in 1999), the National Curriculum was revised. This revision was an opportunity to incorporate ESD into general guidance and specific requirements given the prominence of education and sustainable development in the government's agenda. Indeed, records from the Environmental Select Committee state that "largely through the influence of the SDEP" (UK Parliament, 2003) the revised National Curriculum Key Stage 1 – 2 (5-11 years) included a sustainable development aim:

> "The school curriculum should aim to… develop [pupils'] awareness and understanding of, and respect for, the environments in which they live, and secure their commitment to sustainable development at a personal, national and global level." (DfEE, 1999)

This principle resonated with Lucas' (1972) education <u>about</u> the environment, as well as education <u>for</u> sustainable development. Education for sustainable development also appeared in the secondary curriculum (Key Stage 3 – 4, 11- 16 years), linked with science, geography, citizenship and design and technology, as per the following extract:

> "Education for sustainable development enables pupils to develop the knowledge, skills, understanding and values to participate in decisions about

> the way we do things individually and collectively, both locally and globally, that will improve the quality of life now without damaging the planet for the future. There are opportunities for pupils to develop their understanding of sustainable development within the school curriculum, in particular in their work in geography, science, D&T and citizenship.” (DfES, 2004, p. 11)

Despite the Geography Key Stage 3 (11-14 years) curriculum mentioning ‘climate’ at this point, any reference to the phenomenon of ‘climate change’ was absent. Further, the curriculum’s solitary mention of global warming (in Key Stage 3 Science) only went so far as to exemplify content, whilst also implying uncertainty regarding its causes:

> “Pupils should be taught: about the interplay between empirical questions, evidence and scientific explanations using historical and contemporary examples [for example, Lavoisier’s work on burning, the possible causes of global warming].” (DfES, 2004, p. 73, brackets in the original)

The secondary curriculum also included ESD as one of three ‘other’ aspects of the school curriculum (behind ‘financial capability’ and ‘enterprise and entrepreneurial skills’) (DfES, 2004). Blum and Husbands (2009) noted that locating sustainable development outside disciplines, assessment and inspection regimes meant that schools could choose the type and amount of attention they would pay towards it. However, consistent with Scott and Reid’s (1998) appraisal of environmental education in the 1980s (Subsection 3.2.3 above), the government was aware, via the Select Committee on Environmental Audit, that there had been a lack of previous success for non-curricula topics:

> “The QCA acknowledges that the history of the cross-curricula theme is not one that has been “littered by success”. Ofsted told us that not one cross-cutting theme has ever been successful. Without a clear lead within the management team of a school, and a school policy, cross-curricula themes can often be dealt with in a superficial way to try and accommodate the latest Government priority and fail to deliver genuine change. Without clear ownership, a cross-cutting theme such as sustainability, has no natural home or baseline and can be easily lost.” (UK Parliament, 2003)

Indeed, in 2003, Ofsted reported that, amongst a sample of 26 schools known to be involved in ESD, the approaches and activities were inconsistent. The report concluded that these schools could inspire others to "take the first steps" towards integrated education for sustainable development, but that they were not meeting "their own" ESD aspirations (Ofsted, 2003, p. 19). On the one hand, these comments can be viewed as highlighting a lack of achievement, on the other, they are noteworthy because they locate the responsibility for ESD with schools, rather than government policy. Any sense of failure is associated with a lack of leadership within school management and in relation to schools' own ESD aspirations, rather than to a curriculum structure that places sustainability or the environment as a cross-cutting theme.

Beyond education, the government's climate change response was being tethered to science, technology and economy, as attested to in Prime Minister Blair's climate change speech at the Prince of Wales' Business and the Environment Programme Lecture:

> "Just as science and technology has given us the evidence to measure the danger of climate change, so it can help us find safety from it. The potential for innovation, for scientific discovery and hence, of course for business investment and growth, is enormous." (Blair, 2004)

The speech elaborated upon a plan to reduce carbon emissions by 2020 by refurbishing and rebuilding schools through the *Building Schools for the Future* programme:

> "All new schools and City Academies should be models for sustainable development: showing every child in the classroom and the playground how smart building and energy use can help tackle global warming… Sustainable development will not just be a subject in the classroom: it will be in its bricks and mortar and the way the school uses and even generates its own power… Our students won't just be told about sustainable development, they will see and work within it: a living, learning, place in which to explore what a sustainable lifestyle means." (ibid.)

The government's approach coupled climate change response with economic and technological solutions, positioning climate as a threat to humans more so than the

natural environment. Across this booming period of sustainability/sustainable development, the climate crisis was institutionally and politically present, while the environment (and environmental education) gradually receded from the discourse.

3.3.3 Peak ESD

Over the course of this period, and reaching into the 2000s, as Sauvé, Berryman and Brunelle described it, environmental education was being "subsumed by the huge tidal wave of the globalized and globalizing politico-economic project of sustainable development" (2007, p. 49). The Decade of Education for Sustainable Development (2005-14) had commenced to "mobilize the educational resources of the world to help create a more sustainable future" (UNESCO, 2019), which corresponded with an increase in research activity internationally (Aikens et al., 2016).

The international transformations were also noted as occurring in the UK, as Vare and Scott remarked:

> "Whether we view sustainable development as our greatest challenge or a subversive litany, every phase of education is now being urged to declare its support for education for sustainable development." (2007, p. 191)

Thus, in 2006, the UK Government launched *the National Framework for Sustainable Schools* to "help schools identify what success might look like from here to 2020" (DCSF, 2008b, p. 3). The framework was implemented through the *Sustainable Schools Initiative* under the auspices of the Department for Children, Schools and Families (DCSF). While the initiative was linked to the UK's *Sustainable Development Strategy, Securing the Future* (HM Government, 2005), it was a commitment under *The Children's Plan* (DCSF, 2008c), rather than, say, a climate change or environmental strategy. Arguably, such positioning diminished the government's obligations for this strategy to genuinely tackle environmental problems and climate change.

With lofty rhetoric and voluntary participation, the initiative aimed for "every school to be a sustainable school by 2020" (DCSF, 2008c, p. 7). The environmental education 'salvation' narrative (Berryman & Sauvé, 2013) was evident, with education positioned to 'achieve' sustainable development: "there can be few better places than schools to show the way on sustainable development"

(DCSF, 2008a, p. 4). Similarly, sustainable development was positioned as a cure-all for the modern challenges of "climate change, obesity, global poverty, tensions between and within nations" (DCSF, 2008c, p. 4). Scott (with Reynolds) (Reynolds & Scott, 2012; Scott, 2015, 2017) has been critical of the initiative for a number of reasons. First, the eight themes or 'doorways' that the initiative was organised around (food & drink, energy and water, travel and traffic, purchasing and waste, buildings and grounds, inclusion and participation, local well-being, and participation) were chosen to align with other policy areas (Scott, 2015), such as children's physical, emotional and economic wellbeing. Second, the initiative offered a simplified perspective of sustainability and adhered to a notion of sustainability that accommodated 'business as usual', rather than critiquing processes of production and consumption, which limited the creativity of schools. Third, the initiative failed to recognise the importance of ecology or biodiversity, which chimed with a tendency found in the sustainable development discourse (discussed in 3.3.1.3 above). This omission was addressed with the launch of a biodiversity 'doorway' in 2017, more than 10 years after the initiative's inception and seven years after government funding had ceased. Later discussions (Chapters 4, 6 and 9) return to the positioning of the natural environment relative to climate change education today.

3.4 2000s – 2010s: Multiple policy milestones for climate change

In several respects, the 2000s and 2010s saw a growing policy prominence of climate change. However, as this section describes, events in the international policy arena did not follow a straightforward path towards 'progress', nor did they result in a clear policy position on climate change education in England. Here, a series of events and changes at the international and national levels that, arguably, have a bearing on climate change education in England today is outlined. The section starts by reflecting on international events related to climate change and climate change education (Subsection 3.4.1), then the focus is on national events (Subsection 3.4.2).

3.4.1 International policy shifts

3.4.1.1 A faltering trajectory in climate change policy

Several important moments for international climate change policy occurred in the 2000s and 2010s, some that could be construed as progress on climate change,

whilst others can be seen as hampering efforts. First, the Kyoto Protocol came into force in 2005, 13 years after the principles of the UNFCCC had been agreed, and just over 100 years since Svante Arrhenius had identified the effect of greenhouse gases on the earth's temperature (Weart, 2017). This significant milestone was followed, in December 2009, with the heavily anticipated COP15 (Conference of the Parties) in Copenhagen. The event was meant to produce agreement on a climate change mitigation framework beyond 2012, bringing together the largest ever gathering of world leaders alongside civil society organisations, individuals and 'activists' in numerous guises (Brookes & Nuthall, 2009; Harrebye, 2011). Yet, COP15 was perceived by some to be a failure (Black, 2010; Goeminne, 2010; Sterk et al., 2010) in that it concluded with a (non-unanimous) agreement that was 'noted' rather than 'adopted'. Shortly afterwards, in January 2010, the IPCC admitted to a small but significant error in a previous report (Carrington, 2010), which brought the scientific basis of climate change as well as the associated institutions and policies, into question. Arguably, these two events undermined confidence in both the science and institutions of climate change.

Nevertheless, by the mid-2010s, the *Paris Agreement* (UN, 2015a) (superseding the *Kyoto Protocol*) was reached. The *Agreement* directed global intent towards managing temperature rise, as captured by the aim to:

> "Strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by … holding the increase in global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change" (UN, 2015a, Article 2.1(a))

Echoing previous claims of international leadership on sustainable development and climate change, the UK Government claimed to play a leadership role in securing the *Agreement* (BEIS, 2016) and pushing the European Union towards ambitious emissions reductions targets (DECC, 2015). The *Paris Agreement* entered into force in November 2016 and, as of August 2020, it had been ratified by 189 (out of 197) parties to the Convention (UNFCCC, 2020).

3.4.1.2 'Soft governance' for ESD and climate change education

Meanwhile, in climate change-related education, a multi-nation study conducted by the International Alliance of Leading Education Institutes (IALEI) (Læssøe, Schnack et al., 2009) found that, by the end of the 2000s, climate change education was "developing its own identity" (2009, p. 14) in policies, although it was still a fringe topic in research (as part of science education) and practice (as part of environmental education or ESD). International-level initiatives were rooted in international climate change policy or agendas. For instance, UNESCO melded climate change education with the ESD agenda, in the *Climate Change Education for Sustainable Development* (CCESD) initiative (UNESCO, 2010). This initiative sought to raise awareness of climate change in non-formal education settings, whilst also emphasising efforts at the school-level. It aimed to build capacity for implementing quality CCESD in schools, and to help school students, "understand, address, mitigate and adapt to the impacts of climate change, encourage the changes in attitudes and behaviours needed to put our world on a more sustainable development path, and build a new generation of climate change-aware citizens" (UNESCO, 2010, p. 4). A few years later, the *UN Alliance on Climate Change Education, Training and Public Awareness* (UNFCCC, 2014a) was established to improve the coordination of climate change education, training, public awareness, participation and access to information, and to link to the UNFCCC process. By the middle of the decade (and at the conclusion of the UN Decade of Education for Sustainable Development), a follow-up study (Læssøe & Mochizuki, 2015) to the earlier IALEI report (Læssøe, Schnack et al., 2009) found that in 15 of 17 countries they examined, strategic policy documents addressed climate change education. However, in most cases, it was predominantly being implemented at a "general and intentional level" and via unregulated "soft governance" (Læssøe & Mochizuki, 2015, p. 33). They also identified the alignment of climate change education with discourses and policies of green economy and, in the UK, as tied to STEM and the labour market. In sum, Læssøe and Mochizuki noted a continuing lack of clarity about the role education was playing in response to climate change and that "existing efforts seem too weak to ensure a mainstreaming of ESD and CCE" (2015, p. 38).

3.4.1.3 The SDGs recommit the world to sustainable development

Parallel to the policy transformations relating to climate change and climate change education were policy shifts concerning sustainable development. In 2015, the same year that the *Paris Agreement* was reached, the Millennium Development Goals (MDGs) were superseded by the 17 Sustainable Development Goals (SDGs) through *Transforming our World: the 2030 Agenda for Sustainable Development* (United Nations, 2015). The SDGs positioned poverty eradication as the world’s most significant problem and economic growth as a necessity for sustainability. Through the inclusion of five goals related to the environment and one (Goal 13) specifically focused on climate change (included in my policy analysis), the SDGs paid more attention to the environment and climate change than the MDGs, although, consistent with criticism discussed in Subsection 3.3.1 above, they have been criticised for a lack of integration between the social, economic and environmental goals (e.g. Stewart, 2015). Also, according to Kopnina (2016), they failed to mention the intrinsic value or acknowledge the rights of nature.

Thus, the SDGs re-affirmed the UNs commitment to an ESD agenda with education positioned as a strategy to address poverty and environmental sustainability. Arguably, education featured prominently, with a standalone goal: “Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” (2015, p. 19) (included in my policy analysis). Moreover, based on an exhaustive content analysis of 40 major reports from across the UN system (Vladimirova & Le Blanc, 2015), links were identified between education and all the other SDGs (except for oceans), with the most emphasized connections being between the education and growth (Goal 8) and education and gender (Goal 5). In readiness for the conclusion of the Decade of Education for Sustainable Development, and in response to Target 4.7 of the Sustainable Development Goals, the Global Action Programme (GAP) on Education for Sustainable Development was launched to “generate and scale-up concrete actions in ESD” (UNESCO, 2014, p. 9). At the international level, as the 2010s drew to a close, the sustainable development discourse and agenda remained strong, a situation that Jickling described as problematic:

> “It appears that sustainable development, as an organizing framework and provocateur of dissensus, has had little traction in problematizing the dominant

> economic discourse. If anything, the evidence provided suggests a stealth victory for neoliberalism." (2017, p. 20)

3.4.2 The emerging national picture

3.4.2.1 Significant occurrences in climate change policy

Parallel to these international events, several significant events relating to climate change policy took place in England. First, the government-commissioned *Stern Review* (Stern, 2006) highlighted a need for urgent action on climate change and recognised the importance of school-level education about it for future policy-making. Jackson described the *Stern Review* as a "tipping point" (2010, p. 517) that shaped UK climate change policy. A second significant occurrence was the subsequent passing of the *Climate Change Act 2008* (discussed in Chapter 6). The *Act* committed the UK to substantial greenhouse gas emissions reduction and a transition to a low carbon economy, predominantly via an economic instrument of five yearly carbon budgets. It committed the UK to ensuring "that the net UK carbon account for the year 2050 is at least 80% lower than the 1990 baseline" (Part 1. 1(1)), that is, to substantial emission reductions "from around 14 tonnes per person in 1990 to around 2 tonnes per person in 2050" (BEIS, 2017b, p. 21). Jackson (2010) describes how the various regulatory and economic mechanisms associated with the *Act* were designed to show that technology, innovation and efficiency measures would enable the UK to meet the challenge of climate change. Arguably, the *Stern Review*, and the subsequent *Act*, set a positive tone for a future where climate change could be tackled from within an economic growth paradigm. However, a third major occurrence in November 2009, a few weeks prior to the 'failure' of COP15 and the IPCC error (highlighted in 3.4.1.1 above), an event referred to as 'Climategate' brought the credibility of climate change science into question in the UK (Nerlich, 2010). 'Climategate' involved the unauthorised publication of over 1,000 emails from the Climatic Research Centre at the University of East Anglia. The emails spanned a 15-year period and included some discussion of work that was perceived to be flawed, and discussion of adjustments to data. Coinciding with the other controversies, 'Climategate' was a set-back for progress on climate change in that it mobilised climate deniers and sceptics to contest the scientists' views (Nerlich, 2010).

3.4.2.2 Government change, curriculum change and climate change education

England’s sustainability and climate change-related education in the 2000s, according to Blum and Husbands (2009), lacked theoretical development and was being led by non-government organisations, a tendency that had been observed since the field’s emergence (discussed in Subsection 3.2.2 above). They found that ESD was the dominant frame for environmental education, development education and climate change education. They also elicited that educators did not perceive the need for new or distinctly different educational approaches in relation to climate change. Indeed, Blum and Husbands noted a perception amongst educators that climate change issues were already being addressed and that moving from ESD to climate change education would mean emphasising its issues, especially environmental disasters, thereby “undercut(ting) broader educational attempts to promote sustainable development and sound environmental management” (2009, p. 10). This suggests that, amongst their research participants, climate change education was associated with catastrophe, with sustainable development being perceived as a good and agreed goal.

Towards the end of the 2000s, changes were made to the National Curriculum. Amongst these changes were amendments to Citizenship Education, that had been introduced with high status political support (Davies et al., 2005) during the revisions at the turn of the millennium (discussed in 3.3.2 above) as a foundation subject in secondary schools, and a non-statutory requirement for primary aged pupils. Davies and Chong (2016) describe that the subject was introduced, ostensibly, to address declining civic engagement with an ethos that was strongly aligned to the nation state. They also highlight that the revisions at the end of the 2000s saw a shift in focus from content, ‘generalized skills’ and responsibility, towards a greater emphasis on concepts of democracy and justice, rights and responsibilities, and identity and diversity. Such concepts, arguably, corresponded with the rhetoric and themes of the sustainable development agenda.

Additionally, seven non-mandatory cross-curricular dimensions were added, one of which, “global dimension and sustainable development”, identified climate change as a global challenge alongside conflict, development, poverty and inequality (QCA, 2007). However, reiterating Scott and Reid’s finding of environmental education in the 1980s (Subsection 3.2.3), and the Select Committee on the

Environmental Audit's awareness of the lack of success of integrated approaches (Subsection 3.3.2), another Ofsted report, *Schools and sustainability: A climate for change?* (2008), found cross-curricular approaches wanting, and that the limited cross-curricula activity meant that "the impact on pupils' attitudes and behaviour was less than it could have been" (2008, p. 9). It noted that the most recent revisions of the secondary curriculum included climate change and opportunities for dealing with it in the 'global dimension', yet that the latter was "frequently ignored" (2008, p. 25). It also reported the increasing public and political profile of climate change and that "many children are rightly worried about climate change" (2008, p. 6) and yet, despite the inference to climate change in the report's title, no recommendations were made relative to it. Thus, despite the significant developments in climate change policy in the form of the *Stern Review* and the *Climate Change Act 2008*, arguably, the intent behind the educational response to climate change could be construed as lacklustre.

Then, in 2010, the UK Government changed from a Labour Government under Gordon Brown, to a Conservative-Liberal Democrat coalition led by Conservative Prime Minister, David Cameron. This change was significant for climate change-related education. The *National Framework for Sustainable Schools* and funding for the *Sustainable Schools Initiative* were discontinued. The government, via a letter from the Parliamentary Under Secretary of State for Schools sent to a consortium of charities linked to the initiative, justified the discontinuation based on a decentralisation of authority, the importance of school autonomy, professional judgement and freedom to make locally appropriate choices. The Under Secretary wrote:

> "Sustainability is an important issue for schools, but it should not be centrally driven. We believe that schools understand their responsibilities when it comes to sustainability and, for example, will act to ensure that their buildings are as energy efficient as possible." (Hill, 2010)

That the letter was sent by the Under Secretary, rather than the Secretary of State, thus indicated that the discontinued support of the initiative, and sustainability-related education, was not of the government's highest priority. Moreover, while the rhetoric of autonomy and responsibility unshackled from government intervention might have appeared to grant schools freedom and flexibility, in reality, it relegated

sustainability to the margins. Alexander (2014) describes how there was tendency at this time to tie the rhetoric of freedom and choices to standardisation of curriculum, assessment and inspection, that is, tropes of neoliberally-aligned, market oriented education systems (Ball, 2013). In this educational context, schools experience intense pressure to achieve high student attainment and inspection results. Amidst such 'high-stakes' concerns teachers freedoms are limited (Gewirtz et al., 2019) and other aspects of education are side-lined.

Notably, whilst there were various claimed benefits of the *Sustainable Schools Initiative* (Finalyson et al., 2010), the limited evidence of achievements has been remarked upon in the research literature (Blum & Husbands, 2009; Davies & Pitt, 2010) and in a 2008 Ofsted report, as follows:

> "Most of the schools visited had limited knowledge of sustainability or of related initiatives….[the *National Framework for Sustainable Schools'*] impact tended to be short-lived and limited to small groups of pupils." (Ofsted, 2008, p. 4)

Further, the Department for Children, Schools and Families report - *Evidence of Impact of Sustainable Schools* (DCSF, 2010) - did not provide empirical evidence of achievement. Instead, it offered '15 top tips' for sustainability in schools (which informed a legacy document - *Top Tips for Sustainability in Schools* - discussed in Chapter 6) that were informed by research, policy and practitioner literature. Unsurprisingly, given the lack of ongoing government support and the limited evidence of achievement of the flagship initiative, the emphasis on ESD was noted as diminishing in England towards the middle of the 2010s with, arguably, limited impact in schools (Martin et al., 2015).

Beyond sustainability-related education, and as alluded to above in relation to the discontinued government support of the *Sustainable Schools Initiative*, the change in government ushered an "agenda of restoration" (Ball, 2013, p. 106) into education that linked opportunities and social mobility to notions of excellence premised on traditional conceptions of curriculum, pedagogy and assessment. A curriculum review was initiated and managed within the Department for Education as the relevant statutory authority, the Qualifications and Curriculum Authority, had been disbanded in 2010. In a context where "'essential knowledge' in the 'basics'" (Alexander, 2014, p. 6) was allegedly being overlooked, and against the previously

mentioned knocks to confidence in climate science and the *UNFCCC* process in Copenhagen, the review provoked public debate about the appropriateness of climate change in the curriculum (Blum et al., 2013; Martin et al., 2015). Various accounts of events at this time describe how the Secretary of State, Michael Gove, was seeking to downgrade climate change in the curriculum and that he characterised it as a 'contemporary' issue (Coughlan, 2017; Hicks et al., 2013; Wintour, 2013). Arguably, such a characterisation could diminish the relevance of climate change by rendering it a passing or 'faddish' concern, thereby providing a justification for its removal within a curriculum reform agenda oriented towards essential knowledge in the basics (Alexander, 2014). Whilst accounts of Gove's comments vary, it is evident that the reports of his comments sparked debate, policy submissions (e.g. Hicks et al., 2013) and campaigns (e.g. Change.org, 2013) that advocated the importance of climate change in the curriculum. Climate change ultimately appeared in the revised National Curriculum that was published by the Department for Education in 2014 (discussed in Chapter 6). The curriculum marked a 'return to knowledge', which, according to Alexander (2014), emulated E.D Hirsch's (1987) critique of the 'knowledge deficit' in America. It also resulted in the removal of "non-subjects" (Ball, 2013, p. 107), or cross-curricular priorities, including sustainability and sustainable development. The resulting curriculum did not track the Sustainable Development Goals, despite the UK's leadership in their design (Prime Minister Cameron co-chaired a high-level panel that presented the initial version) and advocacy (Cameron, 2015). Moreover, the revision marked several changes in the Citizenship curriculum which, according to Davies and Chong were "stark":

> "(it) seemed less like a professional formed educational programme and more like a selection of perceived current political priorities" (2016, p. 25).

That is, it was removed as a statutory requirement for primary years (KS 1- 2); it introduced new content related to monarchy, constitutional history and personal financial literacy; and removed content related to media and actions to impact community or environmental change. The revision could be construed as a backward step for education's role relative to the environment.

3.5 Late 2010s: Current context for climate change education

The final section of this chapter turns to the current context for climate change education. I briefly discuss the current positioning of climate change education internationally and in England, before describing aspects of the contemporary political context in Britain. In so doing, this section sets the scene for the empirical research described in the later chapters.

3.5.1 International policies, nation-level responsibilities

Internationally, there are signs that the profile of climate change education, in varied forms, has increased. In 2019, a UNESCO report on countries' progress on climate change education (McKenzie, 2019) found that "almost all" (2019, p. 3) countries reporting to the UNFCCC Secretariat had some climate change education content in their submissions as part of national action on climate change. 'Public awareness' was reported as the most common approach used, although over 50% of the countries reported that they targeted audiences in formal education, and emphasised cognitive learning (over behavioural, social or emotional) thereby tending to align with learning about climate change, rather than advocating for, or acting to ameliorate it. McKenzie noted limited quantitative data in the country submissions and that more research would be needed to develop a more comprehensive picture of their climate change education implementation. So, whilst countries are reporting climate change-related education activities, Reid views the situation more critically. He laments that climate change education is not a requirement of core educational institutions or professionals, indeed that:

> "It is clear that provision of climate change education nationally, regionally and internationally is found wanting in many regards." (Reid, 2019a, p. 770)

In England, Glackin and King found that environmental education sits within a "deficient and muddled policy landscape" (2020, p. 7). Various non-government organisations (e.g. National Association of Environmental Education [NAEE], Keep Britain Tidy, Green Schools Project, London Environmental Educators Forum [LEEF] and Sustainability and Environmental Education [SEEd]) have developed resources and continue to support schools to implement environment- and climate change-related education. Significantly, however, the Department of Business,

Energy and Industrial Strategy, the successor of the Department of Energy and Climate Change, has leadership responsibility for the UK's response to the *UNFCCC* and the *Paris Agreement*, including the education-related articles (Article 6 and Article 12, respectively) that together are referred to as *Action for Climate Empowerment* (ACE). ACE calls on national governments to engage in the development and implementation of education, training, galvanising public awareness and sharing information with other countries. In the UK, responsibility for climate change, including for climate change education, is subsumed within a department oriented around business, rather than, for instance, within an education or environment focused ministry. Hence, climate change education sits in a policy context that positions climate change response as an "enormous potential economic opportunity" (BEIS, 2017b, p. 8). The policy review examines this position in greater depth, but arguably, it is a troubling place for climate change education to have arrived at, if it is to challenge prevailing norms.

3.5.2 Political and civil unrest

Alongside these policy and institutional arrangements, the past few years have been a prolonged period of social and political unrest in England, with key events having arguably had a bearing upon climate change education. This section reflects briefly on some of those events. Appendix 1 provides a timeline of the events, and in the Methods (Chapter 5) I discuss the effect of these events on this research.

The first event was 'Brexit', the process for the UK to exit the European Union. Since the 2016 referendum that initiated this process, there have been two general elections, three changes in prime ministership (all leaders of the Conservative party), multiple rounds of negotiation and administration between UK and EU government bodies along with heated public and political debate. Multiple research participants cited Brexit as taking the attention and resources of government and, as I explain later, one key participant was directly impacted. In parallel, a wave of climate change activism began in 2018. The international scientific community had reported that a 1.5°C warming of the earth was likely (IPCC, 2018b, p. 4), with catastrophic consequences and in an impassioned response, Swedish school girl Greta Thunberg began the 'School Strike for Climate'. Each Friday, she sat outside the Swedish Parliament to protest against the Swedish

government's lack of action on climate change, coining the hashtag FridaysForFuture (*#FridaysForFuture*, 2020). Her protest gathered attention in Sweden and then around the world, with civil action being amplified via Extinction Rebellion's Autumn Rebellion in October of the same year. The UK's first nationally coordinated #FridaysForFuture strike was on 15 February 2019. One month later, on 15 March 2019, it was reported that more than 1 million students participating in 2,000 protests in 125 countries joined the Global Climate Strike (Glenza et al., 2019). Young people demanded that the government "Save the Future, Tell the Future, Teach the Future, Empower the Future", step back from the "obsession" with exams, and focus on "students' lives" (UK Student Climate Network, 2020). In April 2019, Extinction Rebellion occupied key locations in central London for 10 days and demanded that governments "tell the truth by declaring a climate and ecological emergency" (Extinction Rebellion, 2020), whilst on 23 April Thunberg addressed the UK Parliament. A wave of noteworthy responses followed. The Guardian newspaper pledged to give attention to the 'climate crisis' and updated its editorial style guide (Carrington, 2019b; Viner, 2020; Zeldin-O'Neill, 2019); by the end of April, the Scottish First Minister and the Welsh Government had declared a climate emergency; and in May 2019, the UK Parliament became the first in the world to declare a climate emergency (UK Parliament, 2019), once again indicating an intent towards international leadership on climate change. By the time of COP24 in Katowice, Poland (December 2019), 270 strikes had reportedly been held around the world, and a new *Environment Bill* (discussed in Chapter 6) was making its way through the UK Parliament (a process that was later stalled during the COVID-19 pandemic). Climate change related protest action continued into 2020 and was ongoing at the time of writing. Conditions were arguably primed for a climate change education response.

While 2019 was promoted by the government as a year of green action (BEIS, 2017b; DEFRA, 2018a), it is unlikely that the strikes, marches and occupations in the name of climate action were what the government intended. The pinnacle event, Green Great Britain Week, was cancelled, because of a clash with key Brexit dates. Whatever Green Great Britain Week's claims to action might have been, its cancellation resonated with a consistently low priority of environment-related activity within England's political landscape, relative to economic concerns. Indeed, in July 2019, the Committee on Climate Change (2019), an independent

statutory body established under the Climate Change Act 2008, reported that the UK Government was falling short when it came to action on the matter. The government's climate change leadership rhetoric coupled with the economic discourse, persisted all the same, as evident in Prime Minister Johnson's speech to launch UKs hosting role for COP 26 in Glasgow (an event that was also later postponed because of the COVID-19 pandemic):

> "… and that is why we are pledged here in the UK to deliver net zero by 2050 and we're the first major economy to make that commitment, I think it's the right thing to do, I think it's quite proper that should, we were the first after all, to industrialise. Look at historic emissions of the UK we have a responsibility to our planet to lead in this way and to do this…" (Johnson, 2020)

Thus, the contemporary context finds Hulme's (2008) 'climate as catastrophe' discourse persisting and economic drivers are of paramount concern. The recent activism, and responses to it, suggest that an atmosphere exists where policy change relating to climate change education could be possible. The examination of the policy landscape that makes up my empirical study, provides deeper insight into this context and into the views of those who are, arguably, in a position to influence it.

3.6 Summary

As stated at the beginning of this chapter, any history of climate change education can only be a selection and interpretation of events. Whilst numerous interpretations are possible, this historical account provides insight into how things have come to be as they are; in Foucauldian terms, the interest lies in "how do things happen?" (Foucault, 1980b, p. 50) rather than "how is it that we have progressed?" (ibid.). As such, this 'story' of climate change education in England has involved drawing on selected events relating to climate change, education and environmental education. It moved from the early years of environmental education, through the mobilisation of sustainable development, to more recent events regarding climate change and climate change education and then, finally, to some of the recent social and political unrest in England. In so doing, the chapter has revealed several consistencies, transformations and discursive patternings that have preceded contemporary perspectives on climate change education in England, summarised hereunder.

First, environment-related education has been peripherally positioned in formal education in England and subject to 'soft governance', even during its peak in the 2000s as sustainability/sustainable development education. Whilst times of major education reform, such as the *Education Act 1988* or the 2013 curriculum review, had the potential to enable a more prominent climate change-related education response, they have arguably resulted in environment-related and climate change-related education being in an increasingly weakened position in school education. In addition, environment-related education has tended towards education about the environment (Lucas, 1972), not for it, and climate change has had a peripheral position throughout.

Second, successive UK governments have invoked strong international leadership rhetoric on climate change (and sustainable development) and participated in international agreements; however, apart from the *National Sustainable Schools Framework*, this leadership rhetoric has not carried through to education policy to any notable extent. The importance attributed to climate change education (and ESD) within relevant international policy responses has not been reflected in UK policy. Any major educational reform has side-lined climate change related education, such that it has yet to appear as a policy priority.

Third, and consistent with previous research (Berryman & Sauvé, 2013, 2016), this history points to the emergence of a neoliberally-aligned policy context over this period. Evidence of this emergence can be found in: the re-orientation of environmental education towards ESD; the economically aligned responses to climate change; the tendency to 'manage' it through institutional processes; and the current approach to education in England that couples the rhetoric of autonomy with regimes of inspection and accountability. Arguably, such a regime precludes the emergence of ideas that do not resonate with economic growth.

Fourth, whilst a 'climate as catastrophe' discourse appears to have persisted during this period, this has been associated with 'climate as manageable', 'climate as an economic opportunity' and in education, 'climate change as peripheral'. In recent years, the 'climate catastrophe', which has been described as a crisis and an emergency in politics and also seen in this light by the general public, has come to be positioned as one of several political and social crises. However, despite the series of international and national efforts to address a climate change response, IPCC reporting indicates that greenhouse gas emissions continue to rise, and

predicted impacts are increasing in severity, that is, the ‘climate catastrophe’ is worsening.

In sum, the historical analysis in this chapter has provided a critical launchpad for examining the perspectives of policy and the views of the research participants that follow in this thesis. It allows for more in-depth understanding as to how climate change education is situated where it is today. Before moving on to those contemporary perspectives, the following chapter, the final chapter of the literature review, critically reflects on conceptualisations of climate change education found in the research literature.

Chapter 4. Requirements of climate change education: perspectives from the environmental education literature

4.1 Introduction

The recent intensification of civil action in the UK and around the world points to widespread public support for more climate change education. Yet, incorporating more climate change education into policy is not a straightforward matter given that climate change education is conceptualised in various ways. This chapter, the final part of the literature review, further defines the remit of this research by reflecting on the role of education in the context of climate change, according to the environmental education literature.

Sitting alongside calls for more climate change education research (Cutter-Mackenzie & Rousell, 2019; Henderson et al., 2017; Reid, 2019b) is a growing body of related literature. For instance, researchers have explored: practice and pedagogy (Ho & Seow, 2015, 2017; Monroe et al., 2017; Sezen-Barrie et al., 2020; Shepardson et al., 2017); knowledge and awareness amongst educators and students (Arslan et al., 2012; Boon, 2010; Howell & Allen, 2019; Hufnagel, 2015; Monroe et al., 2015; Ojala, 2012a, 2012b); and various nation-level 'status reports' of climate change education policy and implementation have been developed (Læssøe, Schnack, et al., 2009; Læssøe & Mochizuki, 2015; McKenzie, 2019; Trajber & Mochizuki, 2015). In addition, and the focus of this review, are the explorations of what the role of education is or should be in the context of climate change, and descriptions of what 'climate change education' is. The chapter begins, in Section 4.2, by introducing some key discussions about what climate change education is. Section 4.3, the main body of the chapter, then sets out six requirements for a meaningful educational response to climate change that stem from tendencies that I identified in the literature.

4.2 What is climate change education?

There are strongly held views, emanating from disparate starting points and agendas, that education has an important role to play in response to climate change. Arguing from a broad education research perspective, Henderson and colleagues contend "that employing education as a social change lever, and educational settings as sites of socialization toward alternative futures, is our strongest suit" (2017, p.

415). Mochizuki and Bryan (2015), who view climate change education through an ESD lens, position education as a "financially efficient means of tackling the climate crisis" owing to its multiplier effect. They contend that by pupils sharing what they have learnt, families and communities in present and future generations will be better able to adapt to and mitigate climate change. Although, as Henderson and colleagues (2017) highlight, attaining a formal education and developing climate change awareness does not guarantee that individuals will lead more sustainable lifestyles, there is widespread consensus within the environmental education literature that education has a meaningful role to play in response to the climate crisis.

Beyond this consensus, however, the literature is less clear-cut: 'climate change education' eludes straightforward definition. Arguably, such ambiguity is problematic when it comes to policymaking and enactment as it can result in important matters being excluded or interpreted such that education approaches can be counter-productive to climate change amelioration efforts. Such problems were explored at the turn of the 2010s, in a body of literature associated with the International Alliance of Leading Education Institutions (IALEI) multi-national study into country responses to ESD and climate change education, as discussed in the previous chapter (Bangay & Blum, 2010; Blum et al., 2013; Feinstein, Læssøe, et al., 2013; Læssøe, Schanck, et al., 2009; Læssøe & Mochizuki, 2015). Through this work, climate change education was identified as a 'hyper-complex' concept given that its component terms ('climate', 'climate change', 'education') can all be understood in various ways independently and collectively. Climate change education was also found to be used interchangeably with other expressions of environmental education and ESD (Blum et al., 2013; Læssøe, Schnack, et al., 2009). Moreover, the research found that the conceptual complexity and interchangeability of terms contributed to varied conceptions and enactments of climate change education across countries and contexts (Feinstein, Jacobi, et al., 2013; Læssøe, Schnack, et al., 2009; Læssøe & Mochizuki, 2015).

Arising from the research were several proposals for climate change education. Læssøe and colleagues argued that climate change education "must be effectively integrated as a central theme *within* ESD, rather than an independent field" a "more forward-looking version of ESD" (2009, p. 16, emphasis in original), thereby endorsing ESD as the dominant environmental education paradigm.

Additionally, Bangay and Blum proposed that climate change education should be considered a part of 'good quality education', whereby "an educational response to climate change must be *integral* rather than *additional* to broader quality/relevant debates and to any reform they generate" (2010, p. 360 emphasis in original), and Blum and colleagues (2013) questioned the value of formulating a consistent and distinct conceptualisation. Whilst, in principle, Bangay and Blum's proposal, followed by Blum and colleagues', appears reasonable, these conceptual approaches to climate change education are problematic if education is to play a meaningful role in response to the climate crisis. As discussed in later chapters, in England, the quality education agenda is wedded to processes of performance measurement and to discourses that are, arguably, counter-productive to efforts to ameliorate climate change. Hence, echoing recent calls from the literature (Henderson et al., 2017; Reid, 2019a; Rousell & Cutter-Mackenzie-Knowles, 2020), I contend that further conceptual exploration of climate change education is required.

4.3 Requirements for a meaningful educational response to climate change

Building on the abovementioned discussions, this section sets out requirements for a meaningful educational response to climate change. The overlapping and intersecting requirements that surface amongst multiple perspectives in the environmental education literature are as follows: (4.2.1) to open to alternative educational visions and approaches; (4.2.2) to accept and embrace multifariousness; (4.2.3) to integrate multiple types of knowledge; (4.2.4) to orient towards justice; (4.2.5) to engender an eco-orientation; and (4.2.6) to position students as agents of change.

4.3.1 A requirement to open to alternative visions and educational approaches

The first requirement for a meaningful educational response to climate change is an openness in education that accommodates alternative visions of the future, understandings of the world and approaches to education. Such openness challenges the neoliberally aligned approaches to formal education that dominate in England and the Global North. As Sterling (2017) explains, these education systems are organised according to centrally coordinated and delineated knowledge domains that can be reproduced in testing and exams. They assume a future for students that involves participating in a work force that supports a growth economy. Sterling

argues that the current approach has "swamped older conceptions of education as a public service for the public good" (2017, p. 33), and that political and educational systems are ignoring alternative visions of the future and of education. He contends, in the context of the interrelated climate and environmental crises, education needs to be able to respond to "conditions of complexity, difficulty, uncertainty, hopes, and fears that are increasingly the real-world experience for vast numbers of people" (2017, p. 39). Moreover, Sterling contends that there is a need for robust alternatives that start from an ecological worldview (discussed further in Subsection 4.3.5 below). Others with similar critiques of the predominant educational approaches (Anderson, 2012; Kopnina, 2020; Selby, 2009; Selby & Kagawa, 2010; Waldron et al., 2016), advocate that education in the context of climate change should foster alternative visions of the future and society as well as alternative conceptions of life that people might strive for. That is, for broad social and economic shifts away from consumerism, to degrowth, steady-state and circular economic models, or to sustainable contraction and moderation, as Lotz-Sisitka argues:

> "with discourses of *sufficiency* and *equity* as a guide, [climate change education] has the potential to develop a deeper, more reflexive understanding of the nature of climate change impacts and solutions." (Lotz-Sisitka, 2013, p. 81) (italics in original)

Jickling asserts that, whilst there is no recipe for what that education should be, it does require localised and contextualised responses. Put simply, "remaking education will require the hard work of figuring out what is right in your time and place" (Jickling, 2017, p. 28).

Whilst such openness could, arguably, amount to a reorientation of education by choice or design, Kagawa (2013) foretells of a comparable reorientation arising as a consequence of the 'creeping emergency' of climate change. Resonant with Jickling, Kagawa highlights that local leadership and ownership of learning must be part of a future education vision. As per the following explanation, which is particularly prescient considering disruptions to England's education and examination systems during the COVID-19 pandemic, such a reorientation of education could be imposed by a changing climate:

> "One of the possible consequences of the increase of both acute, chronic, as well as creeping emergencies in the future is the constant interruption of formal education provision in various parts of the world … it is very likely that in a climate-constrained future society, boundaries between formal and non-/informal education will inevitably become permeable. In other words, the foci and leadership of learning need to become more flexible depending upon changing circumstances. Top-down, externally and expert-driven educational provisions and learning processes will simply become obsolete or dysfunctional, and more dispersed and horizontal forms of leadership and knowledge creation will become more imperative." (2009, p. 118)

Kagawa's description points to a creeping climate change emergency as *imposing* alternative arrangements and visions upon education; whereas it seems eminently preferable that they are introduced by design. Thus, these perspectives, and others like them, call for an educational response to climate change that accommodates more open-ended approaches and views of the future.

4.3.2 A requirement to accept and embrace multifariousness

A second requirement is to accept and embrace the multifariousness, or the diversity and complexity, associated with climate change education. As indicated above, such multifariousness has prompted questions about the value of a concept of climate change education (Blum et al., 2013), however, perhaps a more meaningful educational response to climate change could result by acknowledging and embracing it.

The diversity inherent to climate change education is captured in descriptions such as Kagawa and Selby's (2013a) broad climate change education 'agenda'. They depict such education as incorporating global climate justice and localisation, anti-consumerism, peace and spirituality as well as supporting multiple types of knowledge (discussed further in Subsection 4.3.3 below). Despite their agenda having been recognised as a significant contribution to the field (Reid, 2019a), arguably, it would be difficult to operationalise in policymaking or enactment contexts. More recently, Stevenson, Nicholls and Whitehouse (2017) have proffered a more concrete description that captures diversity and complexity, describing climate change education as incorporating issues, such as mitigation and adaptation, disaster risk and social justice. The authors also hold that it should be project-based

and action-oriented learning (e.g. vegetable gardening) and engage students in projects beyond the school. Others, who have argued that climate change education should emphasise issues, rather than awareness-raising and behaviour change, draw attention to the associated challenges of climate change, contradictions and tensions along with the inherent complexity of the problem given the multiple stakeholders involved (Lotz-Sisitka, 2013; Zeidler & Newton, 2017).

Anderson (2012) has formulated a climate change education framework that recognises adaptation alongside the aforementioned diversity: a noteworthy inclusion given the limited attention that has so far been paid to adaptation and climate change education (Kronlid & Lotz-Sisitka, 2014). For Anderson, an educational response to climate change should encompass adaptation of institutional environments. That is, that "safe, climate resilient and sustainable learning spaces" (2012, p. 194) will be required to ensure continuity of learning, and so schools can be models for community's both for mitigation and adaptation. Indeed, as has been evident during the COVID-19 pandemic, schools are central to the ways that communities and societies respond to disruptions and recoveries from them. As emergency situations relating to and/or intensified by climate change become more prevalent, the adaptation requirements of schools and education will intensify. In other words, returning to Kagawa, in the context of "runaway climate change":

> "…all education becomes emergency education in that educational initiatives everywhere need to address abrupt and/or chronic crisis situations one way or another." (2013, p. 116).

Thus, as education operates in the context of climate change, adaptation becomes an inevitable consideration.

These sorts of views indicate that, rather than constricting conceptualisations of climate change education to linear models of teaching and learning, a more meaningful approach would embrace the multifariousness, ambiguities and 'inherent messiness' (Todd, 2016) of climate change, provoke thought and stimulate action, and be open to operating in non-traditional, and potentially unplanned, spaces.

4.3.3 A requirement to embody multiple types of knowledge

A third requirement for a meaningful educational response to climate change is to embody multiple and combined 'knowledges'. As discussed below, some of

these knowledge types accord with those that currently dominate in school settings, whilst others appear to extend beyond their margins.

The first area of knowledge accords with disciplinary subjects. Somewhat in keeping with formal education that is organised around subject disciplines, Kagawa and Selby (2013a) describe how climate change education is reliant upon science knowledge and that it should encompass multi-disciplinary, transdisciplinary and interdisciplinary knowledge. Acknowledging the well-recognised challenges associated with teaching and learning that crosses subject boundaries (Bangay & Blum, 2010; Martina et al., 2009; Scott & Reid, 1998), such conceptualisations of climate change education are arguably conceivable within the contemporary disciplinary frameworks applied in school education. Others (Lundholm, 2019; Zeidler & Newton, 2017) whilst similarly highlighting the importance of science, describe climate change education within a socio-scientific frame that combines scientific content with citizenship, and applies socio-scientific and moral reasoning to consider the global consequences of climate change. These authors recognise the shortcomings associated with an over-emphasis on learning about climate change and consequently, call for climate change education to invite students to question assumptions, identify values, compare evidence and explore perceptions. Thus, complementing disciplinary areas of knowledge, a meaningful educational response to climate change also needs to foster critical thinking and epistemic knowledge. For instance, Jickling and Wals (Jickling, 1992, 2013; Wals & Jickling, 2000) emphasise the need for critical thinking capabilities so that students can be aware of how they perceive the world, thus potentially having the wherewithal to address the trouble that lies ahead. Elsewhere, the importance of developing analytical skills and epistemic knowledge to help students move beyond discussion of opinions to question knowledge is raised: their own, their sources of information and that of various stakeholders (Jickling & Wals, 2008; Lundholm, 2019; Monroe et al., 2017; Muis et al., 2015; Zeidler & Newton, 2017). Scott (2019a) has proposed a three-stage climate change curriculum. He describes *Stage 1* as "pretty uncontroversial geography" (2019a, no page) (what is climate change, weather, changes over time, etc) and as largely already being captured in the curriculum in England. Scott's *Stage 2* addresses climate change-related 'controversies' that schools could explore, such as the evidence for rapid climate change and global warming, although he notes that the nuances of such controversies tend to extend beyond school education.

Scott's *Stage 3*, however, extends beyond the current structure of the disciplinary curriculum, to address what might happen in the context of climate change, political decisions around mitigation and the required adaptation to people's lives. In so doing, *Stage 3* introduces values. As Scott points out, this stage introduces difficult questions about whether the climate crisis permits, or even requires, a certain inculcation of values. In relation to requirements for knowledge, it indicates that an education response that is based solely on disciplinary knowledge about climate change does not capture its full complexities.

Thus, additional types of knowledge are necessary for a meaningful educational response. Indeed, reaching well beyond descriptions of climate change knowledge that correlate with discipline-oriented school subjects, Kagawa and Selby's 'agenda' for climate change education draws attention to "cultural, social, economic, ethical, political, and spiritual intelligence to understandings of causes, implications and proposed ways forward" (Kagawa & Selby, 2013a, p. 241). Surfacing in this list of 'intelligences' and elsewhere, are spiritual and emotional ways of knowing and being, knowledge types that arguably exist on the perimeter or outside the margins of mainstream education and beyond policy discourse. Discussions of spiritual knowledge embrace indigenous knowledges that involve different conceptions of time, relationships between human and more-than-human world (Berryman & Sauvé, 2016; Kopnina, 2020) and 'eco-spirituality' (Selby, 2009; Selby & Kagawa, 2010) (explored further in 4.2.5 below). Toh and Cagawas (2010) describe eco-spirituality and stewardship of the Earth as being fostered within different spiritual and religious traditions (e.g. Christianity, Hinduism, Judaism, Islam). Reflections on emotional knowledge, include those of Jickling (2017), who discusses the need to address love, mourning and empathy, and Pihkala who contends that education should confront the anxiety associated with climate change - the "fear, helplessness, hatred, despair and depression" (2017, p. 113), without allowing "despair and 'doom and gloom' [to] have the final word" (2017, p. 114). That is, climate change education should incorporate "black sky thinking" (Selby, 2009) and "confront denial and address despair, pain, grief and loss" (Selby & Kagawa, 2010, p. 44), whilst also engaging with beauty and wonder (Selby, 2009; Washington, 2018) and fostering hope in students (Jie Li & Monroe, 2017; Kagawa, 2009; Muis et al., 2015; Ojala, 2012a). Such authors explain that doing so involves engaging with locally relevant everyday emotions and concerns and relatedly, with

local participatory learning. Whilst Lundholm (2019) highlights research gaps when it comes to understanding how various knowledges impact on action, collectively, these views indicate that knowledge related to climate change includes and extends beyond subject-aligned disciplines. Hence, a meaningful educational response to climate change would embody multiple types of knowledge.

4.3.4 A requirement to orient towards justice

A fourth requirement for a meaningful educational response to climate change is a concern for justice. Drawing from Davies and Pitt, a "pursuit of justice" within climate change education would be to respect and require freedom of thought, speech and action, whilst also helping learners to know that some ways forward are more just than others, for example, that "it is better that the planet survives than dies" (2010, p. 134). In this way, they argue, students would be supported to chart a course for a positive future. Connecting with earlier requirements, justice orientations would encourage the current model of progress to be rethought. This would entail exploring political questions concerning imbalances between those who are most responsible for causing climate change and those who are affected by it as well as empowering people to take action to ameliorate its effects. In the words of Mochizuki and Bryan:

> "Addressing climate change from a social justice perspective can enhance learners' capacity to hold the agencies and institutions which are most implicated in climate change to account and encourage them to imagine alternatives to existing political-economic arrangements and ideologies which promote unjust global relations and practices." (2015, p. 15)

A justice orientation would also balance global and local perspectives and enactments. That is, with respect to the fact that borders are irrelevant, climate change education should be conceived of as a 'trans-border' and globally reflexive concern (Lotz-Sisitka, 2013). However, it should nestle localism within globalism to help students recognise injustice in these two domains in parallel. As Lotz-Sisitka explains, questions of justice should be considered from the perspective that everyone shares the risk and by deliberating upon and proposing contextually located and everyday solutions that are globally reflexive. With context driving pedagogy, learners will be supported to identify, inquire, act and reflect on local

issues through "sophisticated deliberation and reflexive engagement with climate change justice questions that span the local/global and present/future time-space configurations" (Lotz-Sisitka, 2013, p. 81). According to Haavelsrud (2010), paying attention to climate change education's content, form and delivery context would enable students to recognise where changes could occur amongst social, economic, political, cultural, and natural conditions. Local participatory learning, also mentioned in Subsection 4.3.3 above, supported by local climate change knowledge and information and creating local movements for change in response, is thus an important aspect of a justice-oriented climate change education (Henderson et al., 2017). Moreover, according to Rousell and Cutter-Mackenzie-Knowles, it is an emerging innovative area: "participatory approaches which empower communities of learners to design their own climate change projects and modes of engagement with the issue" (2020, p. 202).

As well as incorporating local and global perspectives, a justice-oriented climate change education would bring the natural environment into view. Here, Dei's (2010) anti-racism perspective is helpful. Dei describes the human disconnection from one another and the natural world, and the various forms of oppression that arise, as "environmental racism" (2010, p. 96). This racism sees the overexploitation of common resources by privileged segments of society as detrimental to the environmental sustainability of all, which should thus be counteracted with a climate change education that adopts an 'anti-racist' approach. Indeed, according to Dei (2010), the preservation of a healthy environment will enable intra and inter-generational justice between humans. Haavelsrud's 'peace learning' perspective offers a complementary account of a justice-orientation to climate change education that considers violence as an issue for human and more-than-human worlds:

> "Human rights violations must be seen in combination with violations against nature. It is the clear mandate of education not to contribute to these violations either by omission or commission." (Haavelsrud, 2013, p. 63)

Hence, the need for justice-orientation to climate change education can be viewed from different perspectives to entail consideration of global concerns, local contexts and enactments and with respect to and harmonising with the more-than-human world.

4.3.5 A requirement to engender an ecological worldview

A fifth requirement for a meaningful educational response to climate change is to engender an ecological worldview. Whilst a range of terms and framings used in the literature could describe this requirement – eco-spirituality, ecological worldview, eco-centricity, eco-pedagogies, ecological citizenship education – generally speaking, this requirement is reminiscent of Lucas' (1972) education <u>for</u> the environment. Given that humans have caused the environmental calamity that is a consequence of climate change, there is clearly a need to revisit and transform the relationship between humans and the natural world, to reconnect humans to the more-than-human world and education has a part to play in this.

This requirement draws from numerous discussions and perspectives (Davies & Pitt, 2010; González-Gaudiano & Meira-Cartea, 2010; Haavelsrud, 2013; Henderson et al., 2017; Kagawa, 2013; Kagawa & Selby, 2013; Kopnina, 2012; Reed, 2013; Selby, 2009; Sterling, 2017; Washington et al., 2017). For instance, it draws upon Henderson and colleagues' identification of a need to "understand how humans construct and operationalize their relationships with the natural world" (2017, p. 415) in order to live through the current crises. It also stems from Davies and Pitt's recognition for exploration of "what constitutes a right relationship with nature" (2010, p. 132), a relationship that they contend is motivated towards nature whilst coupled with humans and human flourishing. Returning to earlier discussion (Subsection 4.3.1), Sterling argues for a new view of education that adopts a relational worldview and pays attention to the more-than-human world, that is, for an:

> "ecological educational paradigm appropriate to the world we inhabit and the critical conditions we have created." (Sterling, 2017, p. 40)

Amongst the discussions, even those aligned with eco-centric standpoints (e.g. Kopnina, 2012; Washington et al., 2017), the relationship and interconnections of humans and more-than-humans are of central concern. For example, Washington and colleagues view of eco-centrism is not neglectful of humans, it incorporates 'inter-human justice', alongside:

> "inter-species justice, or ecojustice, for the non-human world. Just as environmental systems involve many interrelationships, we think

> environmental and social systems are entwined, and so social and ecojustice concerns are (and must be) as well." (Washington et al., 2017, p. 4)

Similarly, Haavelsrud's (2013) description of 'biocentric' climate change education places human rights at the forefront with natural rights. He explains that, whilst the social, economic, political and cultural aspects of our society are co-dependent, natural conditions are independent and thus, whilst the limits imposed by nature are human made, it is humans that need to adapt to nature. Thus, an educational response to climate change requires an eco-orientation that not only examines the relationship between humans and the natural environment, but also aims to transform that relationship.

4.3.6 A requirement to recognise and support students as agents of change

A sixth requirement for a meaningful educational response to climate change and the final one discussed in this chapter, is to recognise and support students as agents of change. This involves recognising them as more than recipients of knowledge about climate change that should be reproduced in exams on a journey towards higher education and employment, instead they should be considered as individuals with agency and capacity to contribute to big issues faced by society, including climate change, in the present and the future. This requirement accords with Rousell and Cutter-Mackenzie-Knowles' appeal that, instead of focusing on young people's knowledge of climate change science, researchers should work with children and young people "in genuinely collaborative, imaginative and creative ways" (2020, p. 203). This involves a shift in the way that students are viewed: from observers and passive recipients of information, consistent with learning about climate change, to interpreters of subjects, who can co-construct knowledge and understanding based on the curriculum, prior knowledge and their cultural perspectives (González-Gaudiano & Meira-Cartea, 2010). Drawing from Reid, this would be to recognise students not as "objects" that are acted upon, but rather, as "subjects of initiative and responsibility" (2019a, p. 778), a process that he describes as "pregnant with the promise of bringing something radically new into a broken world" (2019a, p. 778). According to Davies and Pitt, such authentic engagement with students on climate change action, is essential:

> "if we want learners to understand how to take action then a considerable part of their education must occur in an open climate in which engagement is genuinely valued." (2010, p. 133)

Such an action-oriented climate change education would encourage learning about and reflecting on action.

Whilst supporting students' exploration of values and capabilities (Kagawa & Selby, 2010) and developing individuals' resilience (Reed, 2013), this requirement positions students in relation to society and amongst collective action and experience. Drawing on the literature, climate change education should "build a coherent approach to group action that benefits individuals" (Davies & Pitt, 2010, p. 137), combine scientific knowledge with *social experience* and *collective action* (González-Gaudiano & Meira-Cartea, 2010) and position the individual as a social being amongst a collective (Dei, 2010), by taking action to protect individuals and communities that are vulnerable and marginalised. Therefore, according to Henderson, there is a need for conceptualising climate change education as follows:

> "… away from what is broadly seen as a failed emphasis on the notion that individual action alone is sufficient for dealing with climate change at scale…[and to] stimulate a broader stirring of an ecological consciousness in learners and using that newfound understanding to affect change beyond individual actions and instead toward broader climate impacts at scale." (Henderson, 2019, p. 989)

Arguably, these views contrast with the individual attainment metrics that drive formal education, with the individual behaviour change approaches that have been associated with ESD as well as with the theories of change that underpin policy responses centred on public awareness and information. Also, of note is that recognition and support for student agency is conceptually richer than 'doing' activities, indeed, it gathers up requirements for broad knowledges, local and global concerns, eco-orientations, and so on. This requirement is captured in Waldron and colleagues' description of climate change education:

> "… which promotes a critical and holistic understanding of the local and global issues, addresses the historical and contemporary global forces that underpin

> and sustain the current crisis and conceptualises children as present citizens capable of collective action." (2016, p. 907)

Thus, a climate change education that recognises and engages with student agency is one that is richly action-oriented and enmeshed with the other requirements.

4.4 Summary

This chapter has shown that the environmental education literature recognises a rich and complex role for education in response to climate change. The chapter's exploration illustrates that such education defies straightforward description so, rather than arguing that one model is better than another, six requirements have been put forward for a meaningful educational response to climate change that are reflected amongst multiple conceptualisations within the literature. The requirements are summarised in Table 1 below.

Table 1: Requirements of climate change education

Requirement	Features
A requirement to open to alternative visions of the future and approaches to education	Based in ecological worldviews Discourses and visions of sufficiency and equity rather than economic growth Chosen/designed, or imposed because of climate change
A requirement to accept and embrace multifariousness	Mitigation and adaptation, disaster risk and social justice Various enactments and spaces of learning, in and beyond school
A requirement to embody multiple types of knowledge	Disciplinary knowledge Multidisciplinary, transdisciplinary and interdisciplinary knowledge Critical thinking and epistemic knowledge Spiritual and emotional knowledge
A requirement to orient towards justice	Balance of global and local perspectives Local participatory learning Harmonising with the natural world
A requirement to engender an ecological worldview	Revisit and transform relationship between humans and the more-than-human world
A requirement to recognise and support students as agents of change	Students as collaborators in addressing climate change, rather than observers or recipients of information Authentic engagement

	Action-oriented Students as part of society's response to climate change

Clearly, there are contrasts between an educational response to climate change that would meet these requirements and the approach to education that predominates in England today. This is an education system oriented around a predetermined future of economic growth and supported by rational, linear and mechanistic models of learning organised around single subject assessment. Later chapters will reflect on the correspondences between these requirements and the perspectives in policy as shared by policy-influencers. Together, the three chapters of the literature review have provided the context for the empirical study, the presentation of which begins in the next chapter. Chapter 2 theoretically framed the research, Chapter 3 offered *a* history of climate change education up to recent events, and this chapter has explored a range of views from the literature describing what an educational response to climate change should entail. These theoretical, historical and academic perspectives inform the following investigation of the climate change education policy landscape in England, and the Discussion (Chapter 9) that follows.

Chapter 5. Methods

5.1 Introduction

This chapter, which begins the second part of the thesis, turns to the empirical part of the research. The empirical study explores England's climate change education policy landscape through an analysis of policies and the views of individuals in positions of (potential) influence relative to it. It is primarily concerned with the first two research questions:

- RQ1: How is climate change education positioned in England's policy landscape, as evident in policy texts and shared by 'position-holders'?
- RQ2: Who is influencing climate change education in England and how is that influence being wielded?

When coupled with the 'history of the present', the insight from the empirical study enables me to tell a 'story' of the data (Clarke & Braun, 2018) that affords insight into the governmentalities of climate change education in England.

As discussed in Chapter 2, this examination of climate change education in England is theoretically framed by the post-structuralist ideas of Michel Foucault. Questions of 'governing' and 'governmentality' are of central concern, and the concepts of policy archaeology and policy historiography guide the research methodology. Guided by a critically realist ontological and epistemological perspective, qualitative exploratory research methods are utilised to examine the policy landscape. Following the advice of Anderson and Holloway (2020), this chapter clarifies my ontological position concerning 'what counts' as knowledge, and my epistemological position, that is, how I view that knowledge can be understood as well as how these positions relate to my data generation and interpretation of findings. The chapter is structured as follows: it begins, in Section 5.2, by describing the research methodology. Section 5.3 describes the data generation and analysis methods, first, in relation to policy and then, regarding the participants. The final section, Section 5.4, discusses research integrity, by addressing ethical considerations, validity and reliability as well as considering the limitations of the study.

5.2 Methodology

The ontological and epistemological perspective that I adopt in this research could be described as broadly critically realist. From an ontological perspective, I contend that there is an observable reality that exists independently of individuals' interpretations. That is, I adopt an objective understanding that the climate is changing, and that the rate of change is being exacerbated by human activity to the point that a multi-dimensional crisis is occurring amongst humans and more-than-human species. On this basis, I consider that there is a need for society to act. I also acknowledge that policies pertaining to climate change education have effects (or not) within the policy landscape, and that the views of individuals have an effect (or not) on policy; in other words, those views and policies are also 'real'. Thus, the nature of the knowledge that I am examining is consistent with the critical realist principle of 'ontological realism' (Bhaskar, 2010; Cornell & Parker, 2010; Danermark, Ekstrom et al., 2005).

This research is aimed at uncovering *why* the reviewed policy texts offer the interpretations they do and *why* the position-holders are acting and thinking in the ways that they are. That is to say, epistemologically I understand that individuals interpret their worlds differently and, as Cornell and Parker (2010) explain, relative to social, technological or cultural events and discourses. There are myriad possible and valid interpretations of events, situations and concepts, inclusive of climate change education, all of which are context specific, embedded in place and time. Any one individual's perspective can only reveal partial 'truths' about a phenomenon: it is not possible to discern one 'truth', or one correct set of beliefs about what climate change education is or should be. People's interpretations and knowledge are fallible, consistent with the critical realist principle of 'epistemological relativism' (Danermark, Ekstrom et al., 2005). Furthermore, based on the principle of 'judgemental rationalism' (ibid.), appropriate theory and methods can be used to build understanding of the interpretations and to discriminate between them, thereby identifying some explanations as better than others. Hence, ontologically and epistemologically, the research could be understood in critical realist terms.

To help explore various explanations, I turned to Foucault's post-structuralist theorisations (Foucault, 1972, 1980c, 1980e, 1991b) concerning governing, discourse and policy, as discussed in Chapter 2. As mentioned previously, Foucault

did not articulate methods for applying his continually evolving ideas. Rather, he describes his contribution as a "topological and geological survey of the battlefield" and that the "project, tactics and goals to be adopted", that is, the research field and problem, and research methods, are left to "those who do the fighting" (Foucault, 1980a, p. 62). Accordingly, the research methodology and methods described in this chapter draw upon interpretations and applications of Foucauldian post-structuralism in the environmental education and education policy literature (Ball, 1993; Ferreira, 2009, 2013; Gale, 2001; A. Gough, 2013).

To explain, the historical account of climate change education outlined in Chapter 3 is a key contribution to the research as a 'policy historiography' in the way that it looks backwards to trace complexities and changes relative to the present situation of such education in England. The empirical study, which builds on that history, contributes to this study as a 'policy archaeology' in the way that it places various elements in relation to one another to describe the present of climate change education in England. Dean describes policy archaeology as an "analytics of government" (2009a, p. 16). In Gale's terms, policy archaeology establishes "an architecture of policy positions" (2001, p. 389), or speaking positions, as it deciphers the conditions that make the emergence of a particular policy agenda possible, the rules or regularities that determine what is (and is not) a policy problem, and the way these rules and regularities shape policy choices. In Ferreira's words, it is a form of enquiry into "how we think about and seek to govern our own conduct and the conduct of others" (2009, p. 611), that is, an enquiry into the 'conduct of conduct' (Dean, 2009a; Foucault, 1982). Thus, the empirical study is set out to examine the 'conduct of conduct' in relation to the climate change education policy landscape. It is concerned with what is and is not spoken or written in relation to this education, as evidenced in policy texts and shared by individuals in positions of (potential) influence, and shedding light on the mediating forces governing those views. The study seeks to provide insight into the 'parameters' (Gale, 2001), or the governmentalities, of the contemporary climate change education policy landscape in England.

This research is concentrated on how macro-level concerns, such as discourses, and meso-level concerns, including policies and institutions, shape meaning and action. By examining a range of perspectives within the contemporary climate change education policy landscape, the investigation is aimed at system-

level insight that will support subsequent exploration of the underlying discourses and their connectivities. The insight enables me, in the Discussion chapter (Chapter 9), to identify possible explanations for how the perspectives have come to be and, thus it supports thinking about the future of climate change education. Alternative methodologies might call for micro-level analyses, such as linguistic analyses or explorations of how individuals' values or other dimensions contribute to their perspectives. Such analyses are discussed later in relation to limitations (Subsection 5.4.3 below).

5.3 Methods

The research methods were selected to enable identification of thematic ties, correlation or discord within and between policy texts and individuals in positions of (potential) influence. In so doing, and following Gale (2001), the analysis was interested in what was said, more so than who was doing the speaking. This section describes the methods sequentially, first, by describing the policy sampling and analysis methods and then, those utilised with the research participants. However, in reality, the processes of sampling, data generation, analysis and writing were iterative and reflective, informing and informed by each other.

5.3.1 Policy

The policy analysis involved examining policy texts from within a broadly conceived climate change education policy landscape. As discussed in Chapter 2, my understanding of policy as text and discourse draws upon the seminal work of Ball and colleagues (e.g. Ball, 1993; Ball et al., 2012; Maguire et al., 2015), viewing policy texts as part of the social order and as intervening in practice in various ways. Hence, policy texts play a role in governing climate change education and can be used as 'metaphors' to decipher discourse (Foucault, 1980c). This section sets out the policy sampling and analysis methods.

5.3.1.1 Sample

The policy sample needed to be of sufficient breadth to enable identification of themes that were representative of the policy landscape, rather than offering an exhaustive account. However, in the absence of a clear climate change education policy or policy statement in England, and in the context of a 'muddled and deficient' environmental education policy landscape (Glackin & King, 2020), an

appropriate sample was not immediately obvious. Accordingly, the sample was generated through a multi-stepped, iterative process.

An initial list of documents was collated during the first year of the research (October 2017 to October 2018). This list was developed in parallel with the initial literature review, through internet-based research and discussion with my supervisors. Over the course of the interviews, specific policies or areas of policy raised in discussion were added and the list expanded to an unwieldy 164 potential documents. So, I narrowed it by implementing three measures. First, document types were limited to what Bowe and colleagues (1992) define as 'official' policy texts, that is, government or quasi-government organisations' (QANGOs) policies (with three exceptions, indicated in Table 2) that were publicly available on government websites. Second, a timeframe was introduced to include policies released in the period 2010-2019 (with three exceptions, also indicated in Table 2). This timeframe corresponded with the 2010 election that, as described in Chapter 3, marked the beginning of a period of conservative government agendas, beginning with a coalition government (Conservative - Liberal Democrat) under the premiership of the Conservative leader David Cameron, and followed by a series of Conservative administrations up until the (current) Johnson government of today. According to Martin and colleagues, the 2010 election could be characterised as a pivotal moment in terms of government support for ESD. The third measure was implemented to overcome the potential for rigid parameters to unintentionally exclude relevant policies, and to ensure reflection on each policy's inclusion or exclusion in terms of relevance to the research purpose. Here, executive summaries were reviewed and/or documents were skim-read to confirm their relevance, specifically related to RQ1: *How is climate change education positioned in England's policy landscape and amongst position-holders?* That is, I reflected on whether the policy:

- Referred directly to climate change education; and/or,
- Made connections between climate change and schools/education; and/or,
- Appeared to play a significant role in governing education or climate change in England based on the history and/or participant comments.

In short, the included policies were official policy texts, published between 2010 and 2019 that reflected one or more of the above three relevance checks.

Having applied these measures through two passes of the list and sense-checked the list with my supervisors as well as against the literature review, the sample was narrowed to 46 policy texts (see Table 2 below, and Appendix 2 for further detail). I discuss the exclusions in Subsection 5.4.3.1 below. As Table 2 shows, I organised the policies into policy 'families' or categories of policy texts that either cross-referenced one another, or that reflected areas of policy interest. The policy families were: international climate change-related policies (n = 4); national climate change and environment policies (n = 6); national higher education policies (n = 3); national school education policies (n = 7); and the national curriculum (National Curriculum 1-4[1], GCSE subject content and GCE AS and A Level[2] subject content) (n = 26). Acknowledging that some texts straddle families, these categories were useful for organising, making sense of and describing the data. Throughout the thesis, I refer to policies as families or by their individual policy title where relevant.

Table 2: Policy Sample

Organisation	Year	Policy
International climate change-related policies		
UN	1992	United Nations Framework Convention on Climate Change (UNFCCC[3])
UN	2012	Doha Work Programme on Article 6 of the Convention
UN	2015	Paris Agreement to the UNFCCC
UN	2015	Transforming our World: The 2030 Agenda for Sustainable Development (Referred to in the thesis as the Sustainable Development Goals (SDGs))
National		

[1] The national curriculum is organised into key stages (KS) as follows: KS1: Years 1 (age 5 to 6) and Year 2 (age 6 to 7); KS2: Year 3 (age 7 to 8), Year 4 (age 8 to 9), Year 5 (age 9 to 10) and Year 6 (age 10 to 11); KS3: Year 7 (age 11 to 12), Year 8 (age 12 to 13) and Year 9 (age 13 to 14); and KS4: Year 10 (14 to 15) (some students take GCSEs) and Year 11 (age 15 to 16) (Most students take GCSEs or equivalent).

[2] The General Certificate of Secondary Education (GCSE) is a set of exams taken by students, usually at the end of Year 11. Students take the exams after two or three years of studying the subjects. The General Certificate of Education (GCE) Advanced Level (A Level) is usually required for entry into universities. Students generally study for A Levels over two years (Year 12 and Year 13), with exams for Advanced Subsidiary (AS) Levels in the first year and Advanced (A) Level in the second. AS Level exams can count as an independent qualification, or as 50% of A-Level qualifications. The DfE publishes subject content for all GCSE and GCE AS and A Level subjects. Awarding organisations use this framework to prepare their exam specifications.

[3] The UNFCCC was published prior to the timeframe of focus for the sample. It was included because of its continued relevance to international climate change agenda.

Climate change and environment		
UK Parliament	2008	Climate Change Act 2008[4]
BEIS	2017	Industrial Strategy
BEIS	2017(18)	Clean Growth Strategy
DEFRA	2018	National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting
DEFRA	2018	A Green Future: Our 25 Year Plan to Improve the Environment
DEFRA	2020	Environment Bill Policy Statement[5]
Higher Education		
UK Parliament	2017	Higher Education and Research Act
DfE	2017	Teaching Excellence and Student Outcomes Framework Specification
Department for the Economy	2019	Research Excellence Framework: Panel Criteria and Working Methods[6]
School Education		
UK Parliament	2011	Education Act 2011
DfE	2011(13)	Teachers' Standards
Ofsted	2019	The Education Inspection Framework
Ofsted	2018	School Inspection Handbook
DfE/Education Funding Agency	2014	Area guidelines for mainstream schools: Building Bulletin 103
Education & Skills Funding Agency	2018	Guidelines on ventilation, thermal comfort and indoor air quality in schools: Building Bulletin 101
DfE	2012	Top Tips for Sustainability in Schools[7]
Curriculum		
DfE	2014	The national curriculum in England: Framework document: Key Stage 1-4 (excluding Geography and Science)

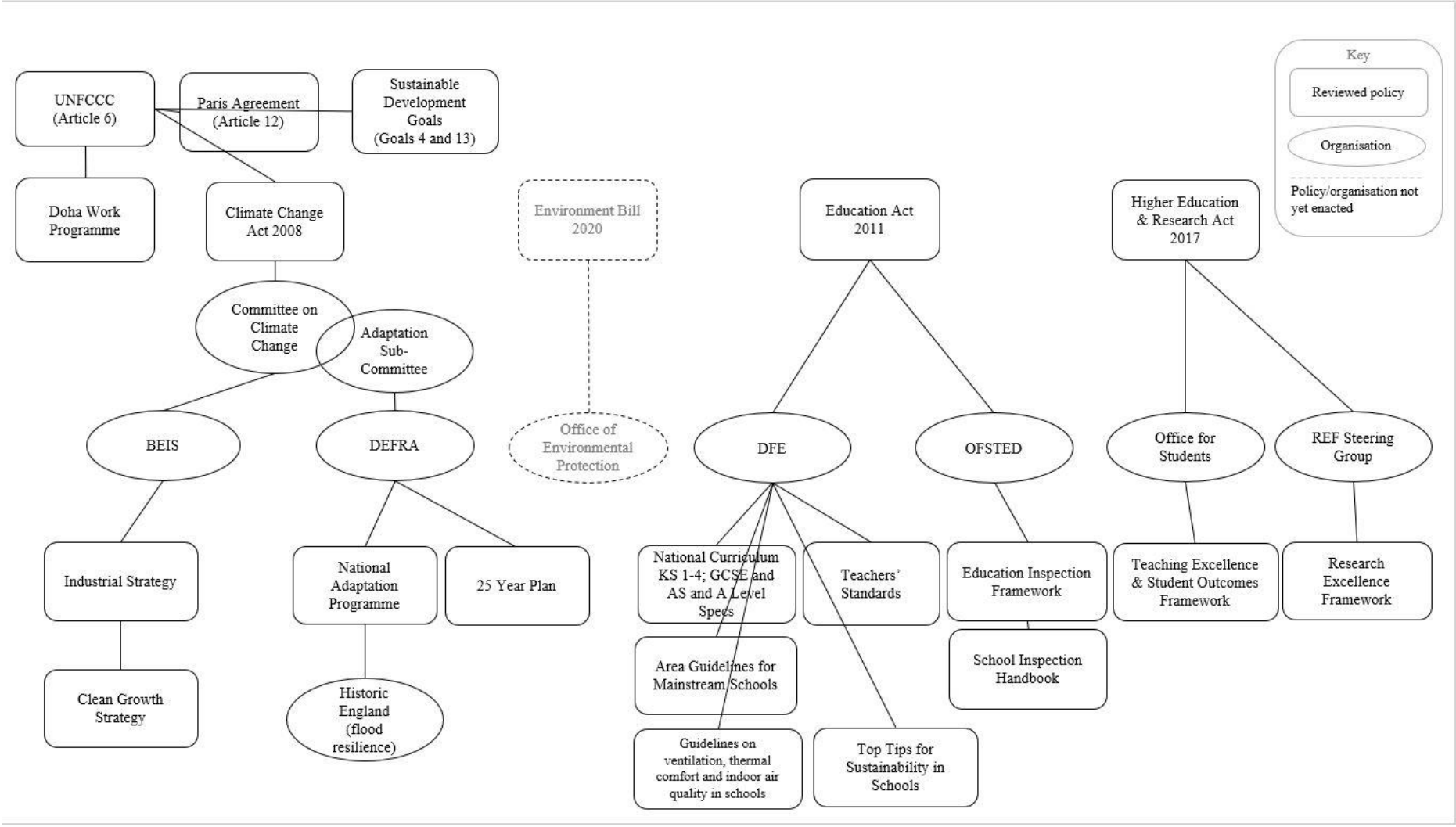
[4] The Climate Change Act 2008 was published prior to the timeframe of focus for the sample. It was included because of its continued relevance to the national climate change agenda.
[5] The *Environment Bill Policy Statement* is not an 'official' policy text; however, given the Environment Bill had not been passed, the policy statement was assumed to reflect the government's intention for the Bill.
[6] The *Panel Criteria and Working Methods* are not an 'official' policy text; however, this document was assumed to reflect the government's intention for the REF.
[7] The *Top Tips for Sustainability in Schools* is not an 'official' policy text; however, it is the clearest climate change-related education document available on the DfE website.

DfE	2014	Geography KS1 – 3
DfE	2013	Geography GCSE
DfE	2013	Geography GCE AS and A Level
DfE	2014	Science KS 1 – 4
DfE	2015	GCSE Combined Science [8]
DfE	2014	GCSE Single Science
DfE	2014	Science GCE AS and A Level
DfE	2015	Environmental Science: GCE AS and A Level
DfE	2015	Citizenship studies GCSE
DfE	2015	Economics GCSE
DfE	2014	Economics GCE AS and A Level
DfE	2015	Design and Technology GCSE
DfE	2015	Design and Technology GCE AS and A Level
DfE	2015	Geology GCSE
DfE	2016	Geology GCE AS and A Level
DfE	2015	Business GCSE
DfE	2014	Business GCE AS and A Level
DfE	2016	Media studies GCSE
DfE	2016	Media studies GCE AS and A Level
DfE	2016	Politics GCE AS and A Level
DfE	2014	History GCSE
DfE	2014	History GCE AS and A Level
DfE	2016/14	Sociology GCSE, GCE AS and A Level
DfE	2015	Philosophy GCE AS and A Level
DfE	2016	Law GCE AS and A Level

Figure 1 (below) depicts the policies (rectangles) and organisations (ellipses) that have leadership responsibilities relating to those policies. The figure is aimed at interpreting them relationally, thus providing some context for the reader, without claiming or implying any relative importance of policies or organisations.

[8] There are two GCSE Science routes. In Combined Science (sometimes referred to as Double Science) students are examined in three science disciplines (Biology, Chemistry and Physics) and awarded two GCSEs. In Single Science (sometimes referred to as Triple Science) students study and are examined in the three sciences as separate subjects.

Figure 1: Organisations and policies within England's climate change education policy landscape



Before proceeding, I make two brief explanatory notes. The first relates to the inclusion of the suite of national policies denoted as 'climate change and environment family'. On first impression, it could appear that several of these policies would have had a limited association with climate change education, in particular, the *Industrial Strategy* (BEIS, 2017a) and the *Clean Growth Strategy* (BEIS, 2017b). However, as discussed in Chapter 3, BEIS' leadership role regarding climate change, higher education and research means that the department's policy portfolio is pertinent to several areas relating to climate change education. Of these policies, as discussed in later chapters, the *Industrial Strategy* appears to be central to BEIS objectives and thus, significant for the UKs climate change response.

The second point concerns the curriculum documents. In the thesis, curriculum (lower case 'c') is used to describe the policy family or to speak generically, and the document's full name, in title case and italicised (e.g. *National Curriculum KS 1-4),* is used when referring to specific reviewed texts. The proportionately high number of documents included in the curriculum family compared with other families reflects the many documents that constitute curriculum policy in England. It also reflects the relative prominence of the curriculum within the school education policy landscape, as evidenced by references to it in other policies and amongst participants. Finally and relatedly, I acknowledge that there are differences between what is intended by the curriculum, and by policy more generally, and what is taught or 'enacted' (Cuban, 1990; Maguire et al., 2015). In accordance with a post-structuralist perspective, I recognise that there are various factors governing the enactment of curriculum in schools, not only policy texts. Nevertheless, where curriculum documents reveal policy intention and are involved in the production and reproduction of meaning, they merit thorough analysis.

5.3.1.2 Analysis

The analysis of policy texts and participant perspectives was guided by Braun and Clarke's descriptions and discussions of thematic analysis (V. Braun & Clarke, 2006; Clarke & Braun, 2013, 2018), more recently reframed as *reflexive* thematic analysis (V. Braun & Clarke, 2019). Supported by their descriptions of thematic analysis, I identified themes within the data sets and made observations about correspondences between those themes within the data sets and across them, without constraining the potential for interesting findings to emerge. This method

acknowledges the 'active' role of the researcher in identifying patterns and themes, selecting which are of interest and reporting them (Clarke & Braun, 2013). In view of Braun and Clarke's more recent discussion of *reflexive* thematic analysis (2019), the analysis process also took into account my own positionality, constituted by my professional background and the political circumstances that coincided with this research. I reflect on this positionality in Subsection 5.4.2.3 below.

Broadly speaking, my policy analysis process involved four steps. The steps overlapped and were undertaken by moving frequently between the original data, the analysis and the writing process for the findings chapters. As Braun and Clarke explain:

> "Analysis involves a constant moving back and forward between the entire data set, the coded extracts of data that you are analysing, and the analysis of the data that you are procuring. Writing is an integral part of analysis, not something that takes place at the end." (2006, p. 86)

The first step in the policy analysis was an initial round of data familiarisation (V. Braun & Clarke, 2006) that simultaneously served to re-confirm the sample. I skim-read each policy to familiarise myself with the structure and content, making short notes about its relevance, e.g. 'key adaptation policy, 'being debated during analysis', 'key step for refining focus of ACE' and 'one of the few relevant documents published by the DfE'.

The second step was a more thorough familiarisation process, where each policy was reviewed with the support of a note-taking template (an example is included in Appendix 3). This was effectively a data generation process that built consistency into my analysis, supporting me in considering the policies relative to my research topic, whilst affording me the flexibility to follow threads that appeared in the text or ideas or absences noted during my review. The template was refined as I reviewed the first few policies. The first section was descriptive and included basic details (e.g. title, date, purpose, number of pages) and the outcomes of a key word search. This was included to support my interrogation of the policies relative to the central concepts of the research, rather than to generate frequency data of specific terms. Based on the review of the literature and position-holder interviews, I anticipated that 'climate change education' would appear infrequently, so a broad set of search terms were used (see Appendix 4). The terms were responsive to the policy

being reviewed, an approach that was consistent with the exploratory, inductive nature of the research, and with the flexibility incorporated into the interview guide (discussed in Subsection 5.3.2.3 below). The second section of the note-taking template was interpretive. It involved a critical review of the policy relative to the research topic and an assessment of the its: i) intention relative to climate change; ii) intention relative to education; and iii) intention relative to climate change education. This reflection was paired with extracts. The final part of the template was a "synthesizing commentary" (K. Anderson & Holloway, 2020, p. 199) reflecting on the descriptive and interpretive sections. Coding is a key step in Braun and Clarke's method (Clarke & Braun, 2013), and it was a key step in my interview data analysis, hence, I had originally intended to follow this note-taking phase by coding the policy texts using NVivo qualitative analysis software (*NVivo*, 2017). However, it became clear that the analytical process undertaken to populate the templates for each policy would be sufficient to enable an iterative thematic analysis.

The third step of the analysis involved using the note-taking templates, rather than the policy texts, as the data source. I reviewed the templates and made a new set of notes that grouped ideas and issues. This step was an analytical process carried out using what Braun and Clarke (2006) term inductive reasoning (i.e. the themes were derived from the data) and theoretical reasoning (i.e. themes were informed by my understanding of the literature). The groups and the templates were reviewed multiple times, with ideas being regrouped. This process helped me to lift my analysis above individual policies, to view the data as a "holistic corpus" (K. Anderson & Holloway, 2020, p. 199) and thus, it afforded a landscape-level perspective. The fourth step reflected on these groupings as the basis of potential themes, that is, as 'central organising concepts' (Clarke & Braun, 2013) at 'semantic' and 'latent' levels. These reflections were at a semantic level, in that I was interested in what was said, descriptions of climate change and climate change education. They were 'latent' in the sense that I was interested in "the underlying ideas, assumptions, and conceptualisations – and ideologies - that are theorized as shaping or informing the semantic content of the data" (V. Braun & Clarke, 2006, p. 84). These themes' significance, meanings and implications (V. Braun & Clarke, 2006) were reviewed iteratively alongside the original policy texts, the analysis of

the position-holder interviews, the literature, and ultimately became the findings discussed in Chapter 6.

5.3.2 Position-holders' perspectives

The second component of my empirical study examines the perspectives of individuals who worked in positions of potential influence in relation to climate change education policy. Scheurich (1994) describes such 'professionals' or, in Foucauldian terms, 'governmental agents', as typically operating with the best of intentions, yet:

> "as not conscious that they are proliferating a social regularity. Their individual actions are common-sensical given the grid of social regularities that is constituting social life. These individual agents do not have bad intentions; they are, instead, inscripted by and, in turn inscripting governmentality." (Scheurich, 1994, p. 307)

On this basis, the analysis was interested in understanding how individuals function as part of the 'governing apparatus'. That is, in keeping with a policy archaeology, I was more interested in what people say, than who says it; in 'vocality' more so than 'authorship'(Gale, 2001). The research did not set out to differentiate approaches, identify opposites or dichotomies, or judge one conception as better than others (Foucault, 1991b), rather it set out to explore differences in perspectives. Accordingly, the analysis was concentrated on what was said by these professionals in order to decipher the conditions or regularities governing their statements, rather than the attributes of the individuals' and how their personal or professional backgrounds or current context contributed to their views.

5.3.2.1 Sample

Consistent with the policy analysis, the participant sample was aimed at capturing complexity and similarities across a range of perspectives, rather than achieving representativeness of types or saturation of ideas. A 'purposive sampling' method (Cohen et al., 2013) was used, as follows. I sought participation of 'experts', inspired by Ardoin, Clark and Kelsey (2013) sampling of researchers and journal editors as experts in their research on future trends in environmental education research, and Hoskins' (2012) recruitment of professors as experts relative to her study of senior women academics in the UK. In this case, there was not an obvious

network of 'experts' to draw upon, arguably due to factors such as the multi-faceted nature of climate change education, its dispersed governance and its low policy profile in England. I wanted to recruit individuals who have (or have had) a bearing on the field and, given the low profile, individuals who could have a bearing on the field, yet might not prioritise or recognise their role in doing so. Hence, my conception of 'expertise' included several factors: that individuals' worked in relevant fields (science and geography education, environmental education, or climate change); they held relatively senior positions within their organisation; they were perceived to be knowledgeable and (potentially) influential in their field; they could discuss issues relevant to my research topic; and, by virtue of their knowledge, position and field, they were potentially influential regarding climate change education policy in England.

The sample was organised using a typology adapted from Gillard's (2016) study of the role of ideas, discourses and institutions associated with UKs climate change policy. That is, as Table 3 shows, the sample was organised in terms of: i) 'policy actors': people involved in the design or elaboration of policy; and, ii) 'political actors': people involved in policy delivery and endorsement or validation. As the limited engagement with policy influence became more apparent, 'thought leaders' was added to the typology, that is, "prominent non-state actors, and individuals with insightful positions" (Gillard, 2016, p. 29).

Table 3: Typology of policy actors, political actors and thought leaders relevant to climate change education in England (adapted from Gillard, 2016)

Organisation type	Role
Policy actors	
Central government	Politicians, advisers and committee members relevant to climate change education (i.e. climate change, science education, geography education or environmental education)
Civil service	Senior strategists and policy officials involved in international and domestic climate change education
Political actors	
Non-governmental organisations	Senior analysts and knowledge brokers representing stakeholders relevant to climate change education
Media	Senior editors and journalists covering climate change education
Think tanks	Senior advisers, consultants and knowledge brokers involved in or

	relevant to climate change education
Private sector	Senior consultants or managers whose work relates to climate change education
Thought leaders	
Academia	Senior academics whose research and/or teaching relates to climate change education

I also recruited from across a range of professional fields of relevance to climate change education policy influence (indicated in Table 4, below). Consistent with this study's interest in what is said, more so than who says it, I reflected on the typology and the spread of fields as my sample developed to ensure my data would incorporate "a representative range of perspectives" (Gillard, 2016, p. 29).

The sample did not extend to individuals who were not considered to be in prominent positions relating to (potential) policy influence, specifically, teachers, practitioners and students. I acknowledge that such individuals would have been likely to add valuable insight to the research and to policy influence, and that they are heavily implicated in the decisions and actions of position-holders and stakeholders. However, generally speaking, the attention of such individuals is directed towards practice, rather than policy influence, so the inclusion of their views would be better suited to a different study. That said, teachers and students are discussed in Chapter 9 in relation to the governmentalities of climate change education and when considering avenues for future research. I also did not seek out climate change sceptics or individuals who were known to be unsupportive of climate change education. Investigating the perspectives and governmentalities of such participants could lead to interesting insight in future study, however doing so as part of this study would have introduced methodological implications (e.g. changes in sampling and interviewing methods) that would have unhelpfully impacted upon the design of this study.

The sampling process began by brainstorming participants or organisations known to me or my supervisors, personally or by reputation, who we considered to be experts. In the first wave of recruitment, 14 participants from across the typology and the fields were invited by email to participate, of whom 12 accepted (see Appendix 5 for a sample email). Subsequent recruitment occurred more organically alongside the interviews through purposive sampling of experts, particularly when

gaps appeared in the sample (Hoskins, 2012), and using reputational snowball sampling, as per Gillard's approach (2016). This method pertains to adopting a notion of 'reputation' that assumes that influential individuals within given fields are interconnected through personal relationships or by reputation. Accordingly, at the end of each interview, and in a follow up email (see example in Appendix 6), interviewees were asked to recommend other potential participants. The incoming recommendations (of which there were few) were added to the master list, reviewed in terms of relevance to the research, cross-checked against the typology, and incorporated into the evolving sample. Between each wave of interviews (indicated in Table 4, below) I reflected on how the sample was taking shape and adjusted recruitment efforts accordingly.

As Baker and Edwards (2012) describe as being characteristic of qualitative research, the intended size of my sample was not pre-determined. A target of $n =<$ 20 interviews was set on the basis that the volume and richness of data that would emerge from exploratory interviews, alongside the analyses of policy texts, would enable robust thematic exploration of the research topic within the time and resource constraints of the study. This sample size was in the range of Mason's (2010) finding that the mean sample size of 560 PhD studies using qualitative interviews was 31, Gillard's interviews with 25 policy and political actors, Hoskins 20 in-depth semi-structured interviews, and Ardoin and colleagues (2013) study of future trends in environmental education, which generated its findings from rich discussion with 15 'experts' combined with analysis of policy and academic literature. Table 4 presents the final sample ($n = 24$), organised according to the adapted version of Gillard's typology.

Table 4: 'Position-holder' sample

Pseudonym	Type	Organisation Type	Field	Wave
Nichola	Political	Non-government	Environment; Climate Change; Education	Wave 1
Rex	Policy	Non-government	Geography; School Education	Wave 1
Ellen	Policy	Non-government	Chemistry; School Education	Wave 1
Alistair	Policy	Government	Climate Change; Engagement	Wave 1
Richard	Political	Non-government	Education; Research; Funding	Wave 2
Molly	Policy	Non-government	Science; School Education	Wave 2

Hugh	Political	University	Climate Change; Research	Wave 2
Chris	Policy	Government	Environment; Engagement	Wave 2
Ada	Thought	University	Ethics; Climate Change; Policy	Wave 2
Sylvana	Practice	Non-government	Environment; School Education	Wave 2
Faith	Policy	Government	Climate Change; Engagement	Wave 3
Theo	Thought	University	Science; Higher Education; School Education	Wave 3
Lawrence	Thought	University	Sustainability; School Education; Higher Education	Wave 3
Lori	Thought	University	Development; Higher Education	Wave 3
Edmond	Thought	University	Geography; Teacher Education	Wave 3
Xavier	Political	Media	Climate Change; Energy	Wave 3
Callie	Policy	Non-government	Meteorology; School Education; Engagement	Wave 3
Ewan	Policy	Private Enterprise	School Education; Sustainability	Wave 3
Jon	Political	Private Enterprise	Energy; Engagement; School Education	Wave 3
Alannah	Policy	Non-government	Science; Education; Policy	Wave 3
Josephine	Practice	Non-government	Sustainability; School Education	Wave 3
Samuel	Political	Government	Politics; Environment	Wave 3
Ambrosia	Political	Non-government	STEM; School Education; Professional Development	Wave 4
Alona	Thought	University	Higher Education; Sustainability	Wave 4

One final note on the sample relates to the terminology used to describe the research participants. As discussed, my original intention was to recruit individuals in positions of (potential) influence relative to climate change education policy. However, as the interviews and analysis progressed and the limited evidence of such influencing became apparent, characterising participants as ‘influencers’, or ‘actors’ relative to climate change education, as per Gillard’s typology, seemed an uneasy fit. Instead, I found the concept of ‘position-holders’ (Powell et al., 2017) to be a more useful characterisation. Powell and colleagues’ research into discourses of water governance, identifies that distinguishing between conflicts of interest and conflicts of position is helpful for understanding and perhaps reconciling governance controversies. They characterise ‘stakeholders’ as “groups that hold positions or

capabilities to transform the situation at stake" (2017, p. 9), and specify 'position-holders' as those who have a position relative to governance of an issue. Consistent with this description, I perceived that my research participants all occupied influential positions within their organisations and in relation to climate change education, they had a position associated with the governance of climate change education, even if they were not utilising it. Hence, it made sense to refer to them as 'position-holders' *in relation to* climate change education policy. However, my participants did not necessarily describe themselves as adopting influencing roles regarding climate change education policy or as having a 'stake' in doing so.

5.3.2.2 Data generation: exploratory interviews

Data was generated through exploratory interviews following Oppenheim (2000) and drawing on accounts of informal conversational interviews (LeCompte, 1993), open-ended interviews (Bogdan & Biklen, 2007) and collaborative conversations (Hollingsworth, 1992). According to Oppenheim, exploratory interviews are useful for generating ideas and investigating how participants feel about research topics, rather than seeking facts or statistics. The method allows for deeper exploration of the research concepts than might be achieved with structured or semi-structured interviews, by allowing interviewees to engage deeply with the subject matter, and for interviewers to respond reflexively to unanticipated topics or turns in conversation. Reflecting key principles of Hollingsworth's collaborative conversations, my interviews encouraged self-reflection and co-learning. In so doing, they resembled research as public scholarship, or of climate change education research *as* learning (McKenzie, 2009). Hollingsworth (1992) remarks that where exploratory methods, such as collaborative conversations, fall outside traditional research methodologies, their legitimacy can be questioned. Hence, the following sections provide a detailed account of the steps taken and decisions made to generate the data set.

5.3.2.3 Interview practicalities

The interviews were carried out between November 2018 and March 2019, with each lasting for approximately one hour. Interview settings were chosen in consultation with each participant. The choice of setting was important to foster a relaxed, conversational atmosphere in which it was possible to cultivate and explore

ideas with the participants (as per Hollingsworth's interviews over dinner) within a one-off interview, whilst also ensuring suitable acoustic properties for audio-recording. Public spaces were deemed to be appropriate, because the content was not sensitive and hence, most interviews were conducted in cafes or meeting spaces at the participants' workplaces. No incentives were provided, although I did purchase refreshments during interviews held in cafes (although some interviewees insisted on buying them for me!). Two interviewees elected to participate via video conferencing, one by telephone (this participant opted out of video conferencing), and one sent an email (discussed as a limitation in Subsection 5.4.3.3 below). I was keen to overcome potentially imbalanced dynamics between expert researcher (me) and participant, or of expert participant and student researcher (me), and to foster a sense of equivalent expertise. Consequently, I adopted a conversational tone and began the interviews with a brief introduction to my career in a range of government and non-government roles relating to education, environment and climate change. To encourage "top-of-mind, blue-sky thinking" (Ardoin et al., 2013, p. 503) during the interviews, interviewees were not provided with the interview protocol in advance of meeting; however, they were introduced to general themes in the introductory email and I clarified questions for two participants via email prior to the interview.

5.3.2.4 Interview guide

An interview guide was used to inform, rather than contain, discussions. Patton (1982) explains how interview guides can support the exploration of predetermined topics via prompting, probing and redirecting the conversation towards key topics, whilst also leaving scope for other emerging ideas. The guide, developed in several steps, also supported comparability between interviews and enhanced the intra-rater reliability of the data. I originally intended to generate data through semi-structured interviews, and drew on existing peer-reviewed interview questions (Ardoin et al., 2018; Glackin et al., 2018) to draft an interview schedule. The schedule was peer-reviewed by a science education PhD candidate, my supervisors, and was piloted with a PhD candidate with environmental education research interests. Whilst the pilot was broadly 'successful', insofar as the interview ran for an appropriate length of time and the interviewee engaged with the subject matter, the discussion seemed somewhat hampered by the question and answer

format. Given that, arguably, the solutions to climate crisis (including climate change education) require exploration, I set the semi-structured format aside, and turned to exploratory interviews.

The semi-structured interview schedule laid important groundwork for the interview guide. To adapt the schedule, I first redrafted the questions as a script that might mimic the language of a conversational, exploratory interview, reviewing and rehearsing the script several times. The script was peer-reviewed by one of my supervisors and adjustments were made. I piloted it with one supervisor as the participant, the other as observer, and our subsequent reflection highlighted several insights and amendments. It became clear that a simpler, more flexible guide would be required. Writing the interview questions into a script was a helpful way to rehearse suitable language, although, in practice, the script format was cumbersome. During the flow of a conversation, I lost my place in the script and when trying to find it again, I lost this flow and missed cues and segues. Second, the experience illustrated the tendency for interviewees to talk around and through ideas, without necessarily sharing ideas sequentially. I thus realised that the guide needed to support notetaking in a way that enabled me legibly and sequentially to catch interesting ideas from the participants, and my own train of thought, while participating in the dialogue. Third, the pilot alerted me to some matters of interviewing technique, for instance, choosing which points are worth clarifying, and learning how to interject without disrupting the flow. The protocol was piloted twice more with peers, and adapted, before the initial round of interviews. An example of the interview guide is included in Appendix 7.

Prior to each interview, I investigated each participant's professional background using publicly available online information, such as their organisation's website, LinkedIn or Research Gate and adapted the interview guide to reflect their expertise. During each interview, the guide was used flexibly to allow for a natural flow of conversation to emerge. At times, the guide helped me to focus the conversation or move it along; however, I was unconcerned about the sequence of questions or about asking all of them. I sought clarification of participant ideas, probed their comments (Bogdan & Biklen, 2007) and was open to exploring ideas and topics beyond what was included in the guide.

The interviews typically ran for about an hour, were audio-recorded, transcribed in full within two days of each interview (see sample transcript in

Appendix 8) and used as the primary data source for analysis. Field notes (see the template in Appendix 9) were made promptly after the interview (on the same day) to reflect on the conversation and its themes, the setting and my interview technique as well as to document any matters to follow up. I used these notes to refresh my memory during the analysis, but they were not drawn upon further in this process.

5.3.2.5 Analysis

Consistent with the policy analysis, the interview transcripts were analysed following Braun and Clarke's guidance on thematic analysis and using a multi-stepped process. My data familiarisation began during transcription (V. Braun & Clarke, 2006) and then, at the end of each wave of interviews, I made notes of my initial impressions. These notes reflected on: i) the extent to which the interview data was responding to the research questions; ii) the sample; iii) any adjustments that should be made to the interview guide; and, iv) noteworthy ideas identified in the data. After all the interviews had been conducted, I reviewed the audio files, transcripts and field notes, corrected mis-transcriptions, and updated my notes with secondary impressions. I then reflected on these notes through a brainstorming process where, working by hand on A1-sized paper, I charted ideas and connections. I reviewed the brainstorm and noted my insights in another document that I set aside. Like the policy analysis, this familiarisation process helped me to start stepping out of the data and thinking analytically.

In the second phase, contrasting with the policy analysis, but consistent with Braun and Clarke's guidance (2006), the transcripts were uploaded into NVivo qualitative data analysis software (QSR International Pty Ltd 2017) for coding. This phase helped me to distance myself from my memory of the interviews, to organise and reorganise my data in relation to my research topic as well as to identify and extract topics that might not immediately appear as obvious. The coding process was deductive, insofar as it was informed by my phase one notes, the literature and my theoretical framework. It was also inductive in that codes were not limited to my preconceptions and I produced codes that could sit outside the research topic. As per the policy analysis, I coded at a 'semantic' level to capture explicit meanings or ideas shared by position-holders, and at a 'latent' or interpretative level to identify ideas, assumptions, conceptualisations and ideologies underlying the position-holders perspectives (V. Braun & Clarke, 2006). The initial round of coding

produced a long list of nodes and sub-nodes. This list was fully revised twice in NVivo by moving data extracts around between nodes and sub-nodes and updating labels until a manageable and sensible list of codes was created. I then printed each node as a separate report, each becoming the basis for the themes that I discuss in the findings (see Appendix 10 for the final list of nodes and sub-nodes). As previously mentioned, and consistent with Braun and Clarke's thematic analysis (2006), and reflexive thematic analysis (2019), I generated findings from position-holder interviews through an iterative process of writing, referring to the node reports, reviewing the original transcripts and the literature and making a range of analytical decisions as I went. Once both analyses were complete, and the chapters drafted, I reread the entire data set to sense-check the findings.

5.4 Research integrity

The final section of this chapter addresses research integrity. It discusses ethical considerations, steps taken to enhance the validity and reliability of the research, and it addresses some limitations.

5.4.1 Ethical considerations

The research was conducted in accordance with the King's College, London College Research Ethics Committee 'Low Risk' research guidelines (Ethical approval number LRS-18/19-6434) (Appendix 11) and informed by the British Education Research Association's *Ethical Guidelines for Educational Research* (BERA, 2018). It also fulfilled the requirements of the research sponsor, the Rosalind Driver Memorial Fund (RDMF), that seeks to "support the advancement of research in Science Education" (King's College London, 2020c).

A fundamental principle guiding my approach to this research was an "ethic of respect" (BERA, 2018, p. 6). As a person who had previously worked as a 'position-holder' in government and non-government contexts (discussed in Subsection 5.4.2.3 below), I was aware that, as Francis remarks, "many of the narratives and devices identified therein are those I have used myself" (2015, p. 440). Therefore, and in keeping with the research intention to focus on what was said, rather than who was saying it (Gale, 2001), I did not set out to pass judgement on the individuals. Moreover, my professional background meant I was cognisant of the types of challenges that position-holders encounter and the complicated factors

at play in work contexts. Thus, my objective was to build understanding of how the policy landscape has come to be as it is, not to criticise individuals' actions or views. The ethic of respect also extended to considering ongoing consent, where ethical practice must occur within "an ongoing interaction of values in shifting contexts and relationships" (Hughes, 2005, p. 231). As Hulme (2008) discusses, perspectives on climate change have transformed alongside various other shifts in society and culture. So, I was alert to how my research participants (and I) might be viewed as historical subjects and how their (our) views might be judged at some later time. I took care to minimise the potential for the position-holders to be harmed or disadvantaged owing to their participation (e.g. by anonymising the data). I balanced this care with an intent to maximise the social benefits of the research and contribute to knowledge enhancement related to climate change education in ways that would "protect(s) the integrity and reputation of educational research" (BERA, 2018, p. 27). This meant that, on occasion, organisation names have been used, or can be deduced from the related text.

The research was deemed to be *low* rather than *high* risk, because the participants were consenting adults recruited on a professional, rather than personal basis, from senior positions within organisations. Whilst the participants shared personal opinions, the subject matter was not personally sensitive, and I assumed their authority to share their views. Participants' voluntary informed consent was obtained through email invitation, an information sheet and a consent form (see Appendix 5, 12, 13). They were advised that they could withdraw participation at any point prior to and during the interview, and for three months following their interview, after which time, analysis would be underway, and it would be impractical to withdraw any transcripts. The research was deemed to be *low* rather than *minimal* risk due to the potential for participants to be identified in the thesis or associated communications. Given the limited attention paid to climate change education policy in England and my intention to recruit influential people, there was a limited pool available to recruit from, so participant identities might be deductible based on attributes or extracts included in the thesis. I minimised this likelihood by using pseudonyms and mostly avoiding organisation names, and moreover, my findings place greater emphasis on the themes I identified than offer critiques of any one individual's perspective. Nevertheless, participants were made aware that while

my research was not set out to implicate individuals, despite best efforts, their responses could identify them.

Confidentiality and anonymity of data was conducted in accordance with ethical guidelines, and with the EU General Data Protection Regulation (GDPR) and associated UK data protection legislation requirements, as outlined by King's College, London (King's College London, 2020a). Personal data was collected and processed on the lawful basis of it being a 'public task' in keeping with King's College London's function as a public authority (King's College London, 2020b). Participants were advised of their right to access their personal data at any time, how the data was being used and how long it would be held. The data was stored to ensure that it could not be attributed to individuals without using additional information, which was stored separately.

5.4.2 Validity and reliability

As highlighted earlier, I approached my research by balancing concern for my participants with that ensuring that my methods enabled fair and full exploration of my topic, thus being in support of my conclusions. Given the interpretive nature of this study, it is unlikely that other researchers would reach the same conclusions as me, even if they followed the same process; I do not consider it a necessary nor useful goal of exploratory studies to do so. The purpose of the research was to explore ideas and, with the support of theory, to contribute to progress on the research problem. My conclusions are 'generalisable' to the extent that they could support understanding other similar situations. Following Lincoln and Guba (1985), I have provided rich detail and evidence to corroborate my findings so that research users and readers could gauge an appropriate level of transferability, rather than claiming absolute transferability to other settings and cultures. The following sections explain the key steps taken to enhance the validity and reliability of the research, several of which have already been indicated in this and earlier chapters, but for clarity are reiterated here.

5.4.2.1 Validity

First, the 'theoretical validity' (Cohen et al., 2017; Maxwell, 1992; Onwuegbuzie & Leech, 2007) of the research is underpinned by the discussion of Foucauldian concepts in Chapter 2. This theoretical foundation shaped my approach

to the history of climate change education and it frames the methodology and methods discussed in this chapter. It continues throughout the thesis to support my interpretation of the governmentalities of climate change education in England. The theoretical validity is further strengthened as I have contrasted and compared the perspectives in my data with a range of views from the literature, introduced in Chapter 4 and then expanded upon in subsequent chapters.

Second, the data analysis process was applied consistently amongst the policy text and interview transcripts. Naturally, the results elicited from each text and transcript differed and some data was 'stronger' than others (Onwuegbuzie & Leech, 2007), that is, some policies and some position-holders' comments were more relevant or provided more useful insights in relation the research questions and to my interpretation of the research field.

Third, to minimise any undue influence that my own biases might have upon the research findings (discussed further in Subsection 5.4.2.3), I followed guidance of Cohen and colleagues (2017), Maxwell (1992) and Onwuegbuzie & Leech (2007). That is, I aimed to achieve 'descriptive validity' by ensuring that my account was a true representation of the position-holder and policy text perspectives. I sought to achieve 'interpretive validity' so that my analysis was true to the intentions, meanings and terms within the data. I also aimed for 'evaluative validity', so that my research extended beyond description and explanation, to make judgements that could contribute to debate in the field.

5.4.2.2 Reliability

I took several steps to enhance the reliability of this qualitative, exploratory research. My approach to inter-rater reliability was informed by the work of Armstrong and colleagues (1997), who found thematic concordance amongst a group of 'socially patterned' researchers, who analysed the same transcript, even though the inherent subjectivity of researchers resulted in divergent interpretations. In this research, conceiving of my supervisors as similarly 'socially patterned' researchers to me, I incorporated peer discussion and debrief as a crucial step at each stage, to 'sense-check', interrogate and collaborate on findings. Peer discussion and debrief was particularly important at the following points: the development of the samples to ensure manageable data sets that would be representative of perspectives; the development and testing of the note-taking template and interview guide; when

validating the coding tree against sample transcripts; and as I wrote my findings, given that the process of writing was part of my analysis. The *intra-rater* reliability of the research was enhanced by use of the note-taking template and the interview guides (as described above), both of which helped me to build consistency during data generation, whilst remaining flexible and open to exploring further possibilities.

Member checking is a contested practice amongst qualitative researchers: while it can enhance the credibility of the research (Lincoln & Guba, 1985; Onwuegbuzie & Leech, 2007), formal member checking can also intervene in data generation processes, both adversely and productively. The approach to member checking adopted in this research, which did not entail participant review of their transcripts, was adopted by weighing up several factors: i) participation in the research was voluntary; ii) given the 'expertise' of the position-holders, I assumed them to be capable of discussing the research topic in a considered manner and to be authorised to do so; and iii) I anticipated participants would be unlikely to want to allocate time reviewing transcripts. However, in lieu of member checking in the form of transcript review, participants were provided with several opportunities to clarify their contributions. At the beginning of interviews, I told them that they could stop the recording at any time to comment 'off-the-record'. At the end of each interview, while still recording, I asked participants whether they would like to clarify answers or add further ideas (many participants added further ideas, none made clarifications). I also sent all of them a follow-up email within 24 hours of their interview inviting them to provide me with any further thoughts/clarifications or contacts. At this juncture, one participant asked to see the transcript and, having reviewed it, made no amendments, whilst four provided me with additional information or reiterated points they had made.

A third measure taken to enhance reliability, was to maintain an audit trail (Onwuegbuzie & Leech, 2007) of the electronic and hard-copy material that was used and generated throughout the research process. This audit-trail helped me to clarify thoughts and verify findings that could also benefit readers or future researchers. The audit trail included detailed "process notes" (Onwuegbuzie & Leech, 2007, p. 240), that is, records of my impressions and ideas as the data generation and analysis unfolded and to justify my decisions. For instance, my database of potential interviewees logged all interactions and my reflections, whilst

my policy database logged the sequence of reflections and analyses that I took to reduce the original document list to a sample for analysis.

5.4.2.3 Researcher reflexivity

While undertaking this research, I was part of the world that I was examining, such that the research process was inextricable from its context and the systems I inhabited. That is to say, I am inextricably implicated in the data that I have generated, analysed and reported. In keeping with reflexive thematic analysis (V. Braun & Clarke, 2019), and as discussed by Cohen and colleagues (2017), reflecting on this positionality is crucial for an honest and critical analysis. Here, I reflect on this in two ways: first, in relation to my theoretical framework and 'governmentalities'; and second, regarding the political context with which my research coincided.

The first reflection concerns 'governmentalities' and that I am subject to the those, including my own, that I have claimed to research. Whilst this is unavoidable, being alert to these governmentalities was fundamental to my reflexive approach. Indeed, Ferreira (2009) emphasises the importance of habitually practising, and developing a 'mentality' of reflexivity and self-critique. She argues for being critically reflexive of our own 'governmentalities', that is, "the mentalities that govern how we think and act in environmental education" (2009, p. 616). To explain, I brought 20 years of professional experience related to environment, sustainability, climate change and education, primarily in Australia, to this research. Alongside this experience, I also brought my own bias (constituted by perspectives and knowledge of institutional, social and cultural contexts) to interpret and explain the situations I encountered (Stevenson et al., 2013). Adopting expressions used by Reid and Scott (2006), I was an 'insider' due to my familiarity with the research field and some of its policy and practice complexities. However, I was also an 'outsider' given that my Australia-based career positioned me outside the histories of the field and the vagaries of the current system in England. My 'outsider' status afforded me with some distance to enable an arms-length analysis, whilst my 'insider' status meant that I did not begin the research as impartial. Indeed, I started with the view that education has an important role to play in response to issues of climate change and with a sense that, to date, the response from education has been inadequate in England and elsewhere. However, I do not believe that this

subjectivity was problematic, because reflecting on my biases expanded my understanding of how I have come to be what and where I am, to question my own governmentalities, and thus, to question the interpretations I made. As Hart (2013) argues, such transparency is important for environmental education researchers, who are critiquing, legitimating and furthering the field. Reflecting on our own intentions helps us relate to our research participants, other research and researchers. Being alert to my bias and reflexive in my practice, when coupled with the broad sweep of perspectives captured in the study, has afforded me a privileged position of being able to observe complexities associated with environmental and climate change education. It is incumbent upon me to use this position to make an informed contribution, that which I develop in the Discussion (Chapter 9).

The second reflection concerns the escalating climate change-related civil action also had an effect, as the civil action publicly foregrounded notions of emergency, urgency and catastrophe (and perhaps amplified Hulme's (2008) 'climate as catastrophe' discourse to a new level) as well as questions regarding the role of education in responding to the climate emergency. Greta Thunberg's campaign 'School Strike for Climate' (*Skolstrejk för klimatet*) began in August 2018 (prior to the commencement of my interviews), Extinction Rebellion's Autumn Rebellion occurred in October 2018, and the first coordinated UK school strike occurred on 15 February 2019; on the same day as the 20th and 21st interviews. The subsequent months of action coincided with my data analysis and writing. It is possible that the sequence of events had a bearing on some interviewee comments when discussing ideas of action and agency and the role of climate change education, or when discussing policy influence. If the interviews were to be scheduled one or two years later, it is possible that the sample, and highly likely that the discussions, would have led to different findings in light of the civil action, as well as in the context of the COVID-19 pandemic and Black Lives Matter movement. As it was, the civil action correlated with increased interest in my research from people I encountered, a level of interest and urgency that was both motivating and challenging as I sought to balance my relatively new research capabilities with a sense of responsibility to provide a clear, robust and useful contribution, and to do so quickly.

5.4.3 Limitations

All research projects are limited, not least, by time and budget. While this research was limited in several ways discussed here, I do not consider that this undermined its overall integrity.

5.4.3.1 Policy sample

The first limitation concerns the policy sample and the possibility that the data reduction process excluded potentially relevant policy texts. The final range of texts was, arguably, sufficiently broad to be representative of the range of perspectives within the policy landscape. Participants did not mention policies from the Department for International Development or international policies, such as the Global Action Programme on Education for Sustainable Development (GAP). Glackin and King's (2020) recent analysis was used to cover exam specifications. A more wide-ranging policy text sample including non-government policies, school-authored curriculum or other policy-like documents that have a bearing upon climate change education policymaking or practice (e.g. Association of Science Educators best practice guides, and the Royal Society's Education and Skills policy) would have produced different correspondences.

5.4.3.2 Policy type

A second limitation pertains to my choice of policy 'type' and the exclusion of all but 'official' policy texts, even though, as discussed in Chapter 2, I acknowledge policy as being a complex process and as constituted by a range of texts, including informal accounts, speeches, press releases and media reports. In the absence of a specific climate change education policy (or policies) in England and hence, relatively few associated 'unofficial' policy texts (such as press releases and speeches), it was deemed unnecessary to extend the range of texts. Doing so would have introduced unnecessary analytical complexity to account for factors, such as media channels and audiences, speech-making and linguistic analysis. Nevertheless, I acknowledge the significant role that media plays in shaping the climate change discourse and public perceptions of environmental issues, the effects of which flow through to environmental education. I also acknowledge the important role that language plays in shaping and constituting reality, social practice and exercises of power (Edwards & Nicoll, 2006; Le Grange, 2013) as well as in politics and

government of the state in the contexts of climate change and education. Whilst I draw attention to language at times, a finer grained linguistic analysis and/or a triangulation of media discourse with official policy texts and position-holders, similar to Fairclough's (2006) analysis of the language of New Labour, could be the focus of future study.

5.4.3.3 Position-holder sample

Here, I address three limitations associated with the position-holder sample. First, and as mentioned above, head teachers, teachers and students were not included in the sample, because of their, traditionally (albeit, contestably) limited roles in policy influence, something discussed further in Chapter 9. The second, relates to the participation of individuals' working within government. Notably, the Department for Education (DfE) declined to participate despite several invitations being sent. Thus, I had to assume that the views of DfE are captured, to a satisfactory extent, in the associated policy texts. In addition, one position-holder's participation (a Member of Parliament) was delayed multiple times due to Brexit-related activities, and then carried out via an emailed response to a small number of questions. Although apologetic, the position-holder's inability to participate fully was disappointing, as the individual was the most senior member of government that had agreed to participate, and he had relevant environmental expertise and professional experience working in government and non-government settings. It is likely that an exploratory discussion with this individual would have been a valuable addition to the research. Given that many interviewees referred to Brexit processes with either thinly disguised criticism or open frustration, particularly in relation to how these were consuming government resources, this situation was arguably illustrative of where the government's attention rested.

Third, I acknowledge that position-holders embody numerous characteristics that were not factored into the sampling method. For instance, I sought to achieve balance between females and males in the sample, yet I did not factor gender into the analysis. Race, ethnicity nor age factored in my recruitment and I do acknowledge the dominance of white, mid- and late-career participants. I also did not select participants on the basis of geographic location, although it is possible that climate change education would be conceptualised differently in different parts of the UK. In this regard, given the difference between rural studies origins and, for instance,

the more recent forest schools movement or urban students' experiences in environmental education, the choice of context could result in different conceptualisations of such education. I acknowledge that deeper consideration of individuals' intersecting qualities would make for differently conceived samples, analyses and findings, which might lend itself to sociolinguistic or rhetorical analysis (e.g. Francis, 1999; Nicoll & Edwards, 2004) or to analysis of individuals' characteristics, yet, as explained above, the emphasis of this research was focused on macro- and meso-level factors and discourses.

5.4.3.4 Literature

Finally, I acknowledge two limitations relating to the literature base drawn upon for this research. The first concerns the scientific premise underpinning the research, that is, the consensus surrounding the causes and consequences of climate change, as captured in the IPCC reports. This research foregrounds questions of knowledge, discourse and their transformations. Accordingly, I acknowledge that, as scientific and socio-cultural knowledge evolves, and understandings and interpretations develop, future research might trouble the IPCC consensus, thereby bringing the findings of this research into question. Nevertheless, the IPCC reports were taken to be a robust baseline and a common benchmark of contemporary 'truth' about climate change. I also acknowledge that whilst this thesis' history of the present aspires to accuracy, it does not claim to capture precisely the complex reality of the evolution of climate change education and it is inescapably subjective: in Gough's terminology, it is *a* history of climate change education (2013). Furthermore, the historical account involved adopting the epistemologies and ontologies of the historians that it draws from (A. Gough, 2013; Hulme, 2008, 2015; Martin et al., 2015), and so, it is "grounded in particular places and the particular people privileged to tell a historical story" (Stevenson et al., 2012, p. 512).

Finally, I acknowledge the limitations inherent in my reliance upon an English-language literature base and the dominance of research cited within it stemming from wealthy countries in the Global North. Given that the English-language term 'climate' does not have a direct translation in many other cultures (Hulme, 2015, 2016) views on climate change education that stem from an Asian or Middle Eastern literature base, or from a Global South context, would be likely to lead to different findings. Overlooking these other literatures and research contexts

is reasonable to the extent that the primary purpose of the research was to investigate perspectives on climate change education in England but doing so limits the potential applications of the research findings. Extrapolations of the findings within or to other cultures and national contexts should be treated with caution.

5.5 Summary

This chapter has described the methodology that guides the empirical research, and the methods used to examine perspectives on climate change education in England that are captured in policy texts and were shared by position-holders. The research, informed by Foucault's post-structuralist thinking and interpretations and applications thereof, set out to explore the 'governmentalities' of climate change education in England. I examined perspectives from across the policy landscape using qualitative, exploratory and interpretive research methods and considering my own positionality as I did so. The next three chapters present the findings arising from the iterative analysis.

Chapter 6. Climate change education in the policy landscape

6.1 Introduction

The historical account of political events relating to climate change, environment and education presented in Chapter 3 describes how climate change and environmental damage have long been recognised as significant problems for society. Whilst economic and techno-scientific responses have tended to dominate policy solutions, education ones have arguably lagged. When considered as part of this research as policy historiography, the events are noteworthy in the way they help in understanding how the present has come to be (Ferreira, 2013; A. Gough, 2013). The next three chapters turn towards the present by setting out the findings from my analysis of England's contemporary climate change education policy landscape. These chapters explore, or 'excavate' (Gale, 2001), perspectives on climate change education that are evident in policy texts and shared by position-holders and they illuminate what can be thought, said or done regarding climate change education in England (Foucault, 1972). The findings chapters uncover a range of interconnected issues that are currently being played out in relation to climate change education in England, many of which can be understood relative to history. In so doing, the findings contribute to this research as a policy archaeology by offering insight into factors that are governing climate change education today.

The findings are structured as follows. In this chapter, the findings from the analysis of contemporary policy texts are presented and discussed. The second findings chapter, Chapter 7, explores position-holders' perspectives on what climate change education is or should be. Together, the findings from these two chapters enable me to address RQ1:

> How is climate change education positioned in England's policy landscape and amongst position-holders?

The third findings chapter, Chapter 8, focuses on the nature of influence amongst position-holders. In so doing, it feeds into RQ2:

> Who is influencing climate change education in England and how is that influence being wielded?

The Discussion (Chapter 9) responds to these two research questions in full, as well as RQ3 and RQ4.

Turning now to this chapter, which discusses the key findings emerging from the analysis of climate change education policy in England. As discussed in Chapter 2, in this thesis an understanding of policy as both text and discourse (Anderson & Holloway, 2020; Ball, 1993; Maguire et al., 2015) is adopted. In addition, policy texts are viewed as intervening in practice in the way that they convey a sense of intention both explicitly and implicitly: they "create circumstances in which the range of options available in deciding what to do are narrowed or changed" (Ball, 1993, p. 12). Alongside this understanding of policy lies a Foucauldian understanding of power that views power as dispersed and working in an 'ensemble' or ' governmental apparatus' (Foucault, 1991a). Thus, as described in the previous chapter, for the analysis, a range of international and national policy texts (n = 46) were considered to play important roles in governing the conditions in which climate change education in England sits. To ensure that undercurrents and discourses within that apparatus were not overlooked, the analysis includes areas of policy that might initially seem less obvious. Whilst each policy was attended to equally during the analysis, national policies are emphasised in the discussion, because national governments have authority for education and the research focus was on understanding England's policy landscape.

This chapter is structured around four features that shape the policy landscape in which climate change education sits. These features have appeared in an assortment of guises, as presences, absences and combinations thereof, and as giving shape to individual policies and policy families. The chapter begins, in Section 6.2, with discussion on the first feature, which is the lack of climate change education policy in England; Section 6.3 discusses the absence of the climate 'crisis'; Section 6.4 explores the inconsistent recognition of responsibility for climate change; and finally, Section 6.5 discusses the fourth feature concerning the neoliberal values that were identified as permeating the policy landscape and are evident in relation to climate change, education and the natural environment. Each feature is first introduced and then elaborated upon with evidence from the analysis. A brief note on referencing: citations are included the first time each policy text is mentioned but, to support readability, they are not included with subsequent mentions, except when direct quotes are being used.

6.2 A lack of climate change education policy in England

The first feature and an important finding to arise from this research, concerns the lack of policy attention being paid to climate change education, school based or otherwise, in England. This distinct lack of attention could reasonably be interpreted as signalling a low prioritisation of climate change education, thereby adding credence to Glackin and King's (2020) finding of a "general absence" of environmental education policy in England. The feature is explained, first, by discussing the international policies, then in relation to national policies and finally, regarding the curriculum.

First, to the international policies, where the findings uncover intentions regarding climate change education. These intentions are salient insofar as they reflect a negotiated consensus agreed between nations at a high level. For example, the *Sustainable Development Goals* (SDGs) have been agreed by "Heads of State and Government and High Representatives … on behalf of the peoples we serve" (United Nations, 2015, para 1). The role for education as part of international efforts to respond to climate change appears to be reinforced by policy alignment, specifically, the acknowledgement of the *UNFCCC* as the central forum for negotiating the response to the phenomenon in other policies (e.g. in Goal 13 of the *SDGs* [United Nations, 2015], the *Doha Work Programme* [UN, 2012] and the *Paris Agreement* [UN, 2015a]). However, arguably, the commitment to education is weakened by expressions reflecting the "soft governance" (Læssøe & Mochizuki, 2015, p. 33) that has long typified ESD and climate change-related education. For instance, the *UNFCCC* delegates responsibility for education to nation states "within their respective capacities" (UN, 1992 art. 6, para. a) and the *Paris Agreement* holds that:

> "Parties shall cooperate in taking measures, *as appropriate*, to enhance climate change education, training, public awareness, public participation and public access to information, recognizing the importance of these steps with respect to enhancing actions under this Agreement." (UN, 2015a Art. 12, italics added for emphasis)

Thus, resembling Gough's critique of the *Tbilisi Declaration* (UNESCO, 1977b), the international commitments to climate change education could be construed as

'exhortations' rather than 'specifications' (A. Gough, 2013); there is little in them to compel England to act on climate change education.

It emerges that the international climate change education-related policies adopt a broad conception of education, that is, as education, training and awareness, with more of an emphasis on capacity building, training, and/or information provision and awareness raising than education. For example, the *Paris Agreement* capacity building-focused Article 11 has five paragraphs, totalling 297 words and 20 mentions of capacity (including 11 of capacity building). In contrast, the education-focused Article 12 is one paragraph of 37 words, with one mention of education. The *Doha Work Programme*, which addresses climate change education more directly and thoroughly than any other reviewed policy, predominantly characterises education as information sharing, awareness raising for individual understanding and behaviour change, being directed towards the general public, rather than formal education systems:

> "Implementation of Article 6 of the Convention serves to spread and improve understanding and awareness of climate change and to change behaviour, and therefore communication should address the general public and all stakeholders." (UN, 2012 Annex A, para. 10)

Notably, explicit mentioning of school-based education in the *Doha Work Programme* is curriculum-oriented:

> "Promote and enhance the inclusion of climate change in school curricula at all levels and across disciplines." (UN, 2012 Annex D, para. 22 (f))

Whilst a broad conceptualisation of education can be applicable and appropriate in some circumstances, it can also result in it being widely conceived in vague terms. When coupled with the limited explicit mentions of formal education, it provides scope for national responses to climate change-related education to overlook school education in favour of other responses, such as mere information provision. Further, statements such as the above, can promulgate views that sharing information about climate change can merely equate to education and lead to changes in attitudes and behaviours, a logic that has been discredited in environmental education research (Kollmuss & Agyeman, 2002). Moreover, when school-based responses are only described relative to curriculum, limitations are placed on how school-based

education can be understood. Thus, whilst the international policies demonstrate a commitment to climate change education, this commitment is problematic for several reasons just described.

Contrasting somewhat with the international policy landscape, at a national level there is no climate change education policy, nor a section within a policy that states a clear intention in relation to such education. This is of concern given that education is governed at a nation level. To explain, in climate change and environment policies, education is afforded a low priority: the *National Adaptation Programme* (DEFRA, 2018b) and the *25 Year Plan* (DEFRA, 2018a), for example, seek to 'raise awareness' of climate change by communicating climate data (alongside 'engaging' disadvantaged groups in the natural world), whilst overlooking school-based responses. In education policies, climate change receives limited attention (e.g. *National Curriculum KS 1-4* [DfE, 2014c]) or is absent (e.g. *Education Act 2011, Education Inspection Framework* [Ofsted, 2019], *School Inspection Handbook* [Ofsted, 2018], *Research Excellence Framework* [Department for the Economy, 2019]). In short, climate change education does not materialise as essential, let alone important.

Akin to the cross-referencing amongst international policies, the analysis identified policy connections within and across areas of policy interest. For instance, there are connections amongst education policies, such as that between the *National Curriculum* and *Education Inspection Framework*. There are also those across areas of policy interest, such as links between the *Industrial Strategy* and the *Research Excellence Framework*, an understandable connection given that industry and research sit within the BEIS portfolio. However, the analysis did not identify connections relative to climate change education, nor did it identify connections between policies concerned with climate change and those related to school education. Furthermore, none of the reviewed national policies refer to the climate change education commitments in the international policies nor to the SDG education goals. These absences are notable for several reasons: the UK is part of the consensus captured in international policies; as highlighted in Chapter 3, the UK has espoused a leadership role relative to those international commitments; and the UK continues to champion these policies and commitments, as evidenced by successfully bidding to host the 2020 UN Climate Change Conference in Glasgow. Thus, the analysis revealed multiple disconnects between international and national

policy commitments, as well as those between UK government rhetoric (i.e. claims to be internationally leading) associated with environment and climate change-related policy problems and the education-related solutions that appear in national policy texts (i.e. are largely missing).

Despite the lack of explicit policy focus on climate change education, climate change *is* included in the curriculum. Here, I turn to policies that constitute the curriculum, that is, the *National Curriculum KS 1-4* and the suite of subject content documents that inform exam specifications. As summarised in Table 5 below, the curriculum includes six direct and explicit mentions of 'climate change' and five direct references to related processes that do not explicitly mention the phenomenon.

Table 5: Direct mentions and references to climate change in the curriculum

Subject	School stage	Quote
Direct mentions of "climate change"		
Chemistry	KS4	"evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change" (p. 221)
	GCSE (Combined and Single Science)	"evaluate the evidence for additional anthropogenic causes of climate change, including the correlation between change in atmospheric carbon dioxide concentration and the consumption of fossil fuels, and describe the uncertainties in the evidence base; describe the potential effects of increased levels of carbon dioxide and methane on the Earth's climate and how these effects may be mitigated, including consideration of scale, risk and environmental implications" (p. 26)
Environmental Science	GCE AS and A Level	"global climate change: how interconnected natural systems cause environmental change: negative and positive feedback mechanisms and tipping points … the difficulties of monitoring and predicting climate change" (p. 7)
Geography	GCE AS and A Level	Landscape Systems: "How landforms and landscapes evolve as result of processes driven by past, present and future climate changes" (p. 8)
Geology	GCE AS and A Level	Non-Core opportunity "the application of evidence to study frequent changes in global climate that characterise the Quaternary period… hominin evolution in response to repeated large scale environmental and climate change, including hominin evolution up to Homo sapiens" (p. 10)
Politics	GCE AS and A	Global Governance: "the role and significance of

	Level	institutions of global environmental governance: including the UN Framework Convention on Climate Change (UNFCCC)" (p. 11)
Direct references to climate change, without directly mentioning "climate change"		
Chemistry	KS3	"the production of carbon dioxide by human activity and the impact on climate" (p. 207)
Chemistry	KS4	"potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate" (p. 221)
Geography	KS3	"including the change in climate from the Ice Age to the present" (p. 243)
Geography	KS3	"understand how human and physical processes interact to influence, and change landscapes, environments and the climate" (p. 243)
Geology	GCSE	"Past global temperature and sea level changes: the major sources of carbon dioxide in the atmosphere (volcanic emissions and burning of fossil fuels); the evidence for changes in climate through geological time (icehouse to greenhouse conditions) and sea level from sedimentary rocks (tillite, limestone and drowned forests) ; the evidence for changes in atmospheric carbon dioxide levels over geological time (sedimentary rock and ice cores) (p. 6)

In addition to these direct references, the analysis identified several other opportunities where climate change could be addressed (see Appendix 14). Of these, five were more apparent, for example, the *Environmental Science GCE AS and A level subject content* refers to "… how anthropogenic activities are interconnected with physical processes, to formulate management strategies and plan sustainable activities" (DfE, 2015d, p. 7), whilst others appear to be opportunities for teaching related to climate change, for using climate change as a theme or context, or for teaching skills that could support climate change education. While some might interpret the number of incidences as enough, when the references are considered in view of the literature, various problems arise. First, and with reference to Lucas' (1972) descriptions of environmental education, this content is limited to education about climate change. That is to say, it is concerned more with the processes of climate change than reflecting on the complexity of the issues or in helping pupils to act on climate change. Second, whilst the *Education Inspection Framework*

advocates that students should be taught as many subjects as possible for as long as possible, the curriculum content and structure does little to encourage any linking between those subjects. Regarding which, interdisciplinary or cross-disciplinary approaches, as discussed in Chapter 4, have been acknowledged as crucial to climate change education (Kagawa & Selby, 2010a). Third, whilst there could be opportunities for schools to interpret education policies through a lens of environmental advocacy, or teachers could 'choose' to orient their teaching to increase coverage of climate change-related content or skills, there is no explicit encouragement in the curriculum nor the wider policy landscape for them to do so. Fourth, there is no guarantee that what is written in the curriculum reflects what is implemented in classrooms. As Stevenson points out, educators interpret or "(re)contextualise" policies in relation to the "the constraints and possibilities of the context in which they work" (2013, p. 153). That is, they do so in relation to their own practice, their own practical theories, their everyday experiences, and their understanding of other policies. Thus, for several reasons, the attention paid to climate change education in the policy landscape, particularly at the national level, could be described as deficient.

6.3 The climate crisis is out of sight

The second feature concerns the way the climate change education policy landscape leaves the climate crisis largely out of sight. The IPCC has called for "rapid, far-reaching and unprecedented changes in all aspects of society" or face "long-lasting or irreversible changes" (IPCC, 2018a, p. 1), with successive UK governments having acknowledged the seriousness of climate change. Yet, this analysis found that the seriousness and extent of the impacts of climate change and the urgency associated with responding to the crisis are largely missing from the contemporary national policy landscape. Of major concern here, is that the climate crisis is left largely out of view in policies relating to school education.

Internationally, the gravity of climate change is acknowledged, for instance, the *UNFCCC* seeks to prevent "dangerous anthropocentric interference with the climate system" (UN, 1992a, art. 2) and the *Sustainable Development Goals* invoke an emergency discourse to: "Take urgent action to combat climate change and its impacts" (UN, 2015b, Goal 13). However, in national policies, climate change is more commonly framed in somewhat benign terms, if not as a positive contributor to

the economy, most notably in the *Industrial Strategy* and the *Clean Growth Strategy*, a matter that is explored further in Section 6.5 below. Indeed, aside from a somewhat emotive mention of "cherished wildlife" in the *Environment Bill Policy Statement* (DEFRA, 2020), a statement that was released nine months after the UK Parliament had declared a climate emergency, the policy landscape is largely devoid of a sense of urgency regarding the environment or climate change. Instead, the *25 Year Plan*, in a chapter that dances around a response to climate change, invokes the ever-present leadership rhetoric alongside a rather gentle response to the issue, oriented towards personal actions, seeking to reduce "our own environmental footprint":

> "But by showing international leadership, supporting developing countries and reducing our own environmental footprint, we can make a real difference. With much at stake, we need to work together to confront pressing challenges. The whole of the UK is fully committed to this most vital cause." (DEFRA, 2018a, p. 111)

Thus, policies in the climate change and environment families tend to frame climate change in relatively benign terms, or as an opportunity. As mentioned above, whilst policies in the education family tend to overlook climate change, when it does feature, for instance in the curriculum texts, it is not apparent that there is a crisis or an emergency, nor that society (including students) should be preparing for its mitigation or adaptation to it. Rather, on several occasions, the curriculum highlights "uncertainty in the evidence" for anthropogenic causes of climate change (*Chemistry KS 4* [DfE, 2014c], *Chemistry GCSE Combined* [DfE, 2015b] and *Single Science* [DfE, 2015a]). Arguably, in the context of few mentions of climate change, the curriculum somewhat diminishes the significance of the current crisis by devoting two of those references to positioning anthropogenic climate change relative to Ice Ages (*Geography KS 3* [DfE, 2014c]) and relative to geological time (*Geology GCSE* [DfE, 2015e]) (see Appendix 14 for further detail). In short, in contrast with the views from the IPCC and with international policies, through the policy analysis, it was found that any notion of crisis is largely silent in the national policy landscape.

6.4 Inconsistent recognition of responsibility

A third feature of the policy landscape concerns the way that the responsibility for climate change, in terms of causes and responses, is addressed. Whilst developed countries' responsibility for causing it is recognised (to a limited extent) in various texts, responsibility for responding to climate change, particularly in relation to education, is lacking. Calls for action largely overlook a role for education and the policy landscape, particularly at a national level, lacks leadership for climate change education. Subsection 6.4.1 discusses how responsibility for the causes of climate change is addressed, whilst Subsection 6.4.2 turns to how responsibility for responding to climate change is addressed in the policy landscape.

6.4.1 Causes of climate change

The first element of this feature concerns how the causes of climate change are handled in the policy landscape. The international policies clearly acknowledge the role of developed countries in causing climate change. For example, the *UNFCCC* states that:

> "The largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs." (UN, 1992, preamble)

It also states that:

> "Accordingly, the developed country parties should take the lead in combating climate change and the adverse effects thereof." (UN, 1992, art. 3, para. 1)

In the national policy landscape, this acknowledgement is less direct and is coupled with the leadership discourse that has accompanied the UK climate change response since Prime Minister Thatcher's climate change speeches in the 1980s (discussed in Chapter 3). For example, the *25 Year Plan's* acknowledgement of the UKs impact on other countries is coupled with a drive for progress:

> "As a developed country, the UK should drive progress on certain SDGs where domestic consumption has an impact on other countries …These include SDGs

> 13 (climate change), 7 (energy), 14 (life below water), 15 (life on land) and 12 (sustainable consumption and production)." (DEFRA, 2018a, p. 117)

In other policies, the acknowledgment of responsibility is less direct or avoided, such as the *Environment Bill Policy Statement* that indirectly acknowledges previous environmental harm through an intention to help "deliver on the government's commitment to be the first generation to leave our environment in a better state" (DEFRA, 2020). In curriculum policies, the responsibility for causes is downplayed or avoided. For instance, in *GCE AS and A Level Subject Content for Economics* (DfE, 2014a) any contribution of the current economic model to the climate crisis is overlooked in favour of contributions to understanding the economic and social environment:

> "… appreciate the contribution of economics to the understanding of the wider economic and social environment." (DfE, 2014a, p. 1)

Where students are introduced to the notion of responsibility for climate change, for instance, in *Geography KS 3*, the tone is benign, whereby students should "understand how human and physical processes interact to influence, and change landscapes, environments and the climate" (DfE, 2014d, p. 243). Arguably most telling, is the way the science curriculum draws attention to "uncertainties in the evidence" relating to anthropogenic causes of climate change; a phrase that appears three times across the suite of curriculum documents and implies that students should question how responsible humans are.

Overlooking or recasting the responsibility for policy problems is not unique to climate change-related policies. Indeed, Bacchi (2009) discusses this in relation to how disability is portrayed in education policy, with the effect of portraying disabled people as the 'problem' and governments as benevolent in their responses, thereby reinforcing the status quo. In the case of this research, this tendency has resulted in overlooking responsibility for climate change by sweeping the causes (and culpability) aside, thereby allowing government responses across the policy landscape, including those in education, to support existing systems and power arrangements.

6.4.2 Responding to climate change

Turning to how responsibility for responding to climate change is portrayed, the analysis revealed that international policies tend to associate climate change problems with victims (e.g. *UNFCCC*) and inequality (e.g. *Sustainable Development Goals*). The educational response to climate change, such as that captured in Article 12 of the *Paris Agreement*, is oriented towards building capacity in countries of the Global South, improving individual understanding of climate change issues, and changing individual behaviours. Whilst such an orientation is justifiable from a justice perspective, in that it focuses international attention on those who have done the least to cause climate change and who are at greatest risk (Lotz-Sisitka, 2013), it largely neglects a role for education in building understanding of (and responding to) systemic causes, particularly in the Global North. These policies enable a framing to arise that finds, as Selby and Kagawa (2010) hold, countries with polluting and consumption rich economies, such as England, being able to ignore the climate change injustices that have been and continue to be experienced by climatically and economically vulnerable countries. In so doing, these policies also permit feeble educational responses to climate change.

At the national level, climate change mitigation responses align with an economic growth discourse, evident in the *Clean Growth Strategy* as a key pillar of the government's climate change response (discussed in detail in Section 6.5 below). The need for adaptation is recognised, for instance, in the *National Adaptation Programme* that acknowledges a need to plan for a "reasonable worst-case scenario" (DEFRA, 2018b, p. ii). However, the *National Adaptation Programme* also positions adaptation as an economic growth opportunity: by exporting climate change resilience capabilities; in relation to adaptation of infrastructure and industry; and in regard to individual and national resilience, that is, for "the health and wellbeing of the nation" (DEFRA, 2018b, p. 41). Whilst it recognises links between education and adaptation, references to schools and adaptation are limited to managing overheating and flooding in the built environment. Otherwise, its education-related attention is directed towards local authority (local government) capacity building, and to the communication to the public about climate change risks and adaptive action they can take. Notably, it refers to 2019 as a "Year of Green Action" for the environment with "children and young people at its heart" (DEFRA,

2018b, p. 5). However, as discussed in Chapter 3, Green Great Britain Week, which was promoted as a pinnacle event (and is also mentioned in the *25 Year Plan* and the *Clean Growth Strategy)* was cancelled due to Brexit.

In the education policy family, the need to respond to climate change is largely overlooked. Whilst the *School Inspection Handbook* encourages student action beyond the curriculum and as preparation for adulthood, the three highlighted opportunities do not prioritise action for the environment or in relation to climate change: there is the military-aligned Combined Cadet Force (2020); the Duke of Edinburgh's Award (DofE, 2019) - "a recognised mark of achievement, respected by employers"; and the National Citizenship Service (2020), the objectives of which are tied to social cohesion, mobility and engagement. Indeed, these opportunities resemble what Davies and Chong, in their discussion of the evolution of Citizenship Education in England, have argued is "an official commitment to character education which emphasises personal morality rather than citizenship education" (2016, p. 21). Arguably, the most action-oriented text included in the analysis was the *Top Tips for Sustainability in Schools* (DfE, 2012). As discussed in Chapter 3, this document is a legacy of the *National Framework for Sustainable Schools*, an initiative that aimed for "every school to be a sustainable school by 2020" (DCSF, 2008c, p. 5). Despite emerging from lofty ambition, this policy initiative (oriented towards sustainability and sustainable development) could be described as lacklustre insofar as its opening sentence states that schools could take these actions "should they choose to" (DfE, 2012, p. 1), rather than requiring it. Furthermore, it emphasises financial, health and wellbeing benefits, which, as I discuss later in this chapter and in Chapter 9, are tied to the 'hyper-individualism' that Hursh, Henderson and Greenwood (2015) describe as permeating neoliberal agendas. Not only is this potentially important guidance for climate change-related action difficult to find online, but it is also found wanting in ambition, and, again, weds action to economic drivers.

The limited attention that education policies pay to responding to climate change contrasts with evidence that Britons are increasingly concerned about it and are willing to support action against it (Steentjes et al., 2020). Putting responsibility for responses into the background is troubling given the increasingly urgent need for action on climate change and for the environment. This leaves students short-changed or, worse, misled in their understanding of climate change.

6.5 The pervasiveness of neoliberally aligned values

The fourth feature is the way the policy landscape reflects neoliberal values, specifically in terms of the economic orientation and market-based approaches that frame climate change, education and environmental policy problems and solutions, such that the benefits of global economic growth are left unchallenged. Whilst individual instances are not necessarily problematic, when considered collectively, the policy landscape reconfirms and reproduces the neoliberal agenda, and its values governing how climate change education can be understood. The effects of a neoliberal paradigm have been widely discussed and viewed as problematic in relation to environmental education (Berryman & Sauvé, 2016; e.g. Hursh et al., 2015; Kopnina, 2015). For example, Hursh and colleagues (2015) argue that neoliberal ideas promoting market-based solutions for solving environmental problems are the cause of current economic and environmental crises. Moreover, their inclusion in policies, specifically in environmental education policies, conceptually and practically, inhibits society from coming up with alternative collective responses. This section discusses three areas where the neoliberal alignment materialises in the policy landscape in ways that have a bearing on climate change education. Subsection 6.5.1 describes the economic orientation to climate change, whilst Subsection 6.5.2 describes neoliberal alignment of education, and Subsection 6.5.3 is concerned with how the natural environment is economically appropriated and disconnected from humans.

6.5.1 Climate change responses are economically oriented

The analysis identified that a commitment to economic growth underpins the climate change responses across the policy landscape. Internationally, the *UNFCCC* weds greenhouse gas stabilisation to economic development:

> "to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and enable economic development to proceed in a sustainable manner." (UN, 1992 art. 2)

Similarly, the *Sustainable Development Goals* ambition to eliminate poverty is predicated on economic growth and repeatedly states the dimensions of sustainable development as, in the order, "economic, social and environmental" (UN, 2015b, preamble). As discussed in previous chapters, such presumptions have been

criticised for denying the emergence of alternative visions for the future and alternative approaches to education (Kopnina, 2020; Sauvé et al., 2007; Selby & Kagawa, 2010; Sterling, 2017).

Economic values and policy solutions are also reflected in the portrayal of climate change in national policies, led by the *Climate Change Act 2008's* emphasis on targets, budgets and accounting. This emphasis is also noteworthy in the *Clean Growth Strategy*, which describes the guiding objectives for meeting the *Climate Change Act 2008* as:

> "1. To meet our domestic commitments at the lowest possible net cost to UK taxpayers, consumers and businesses; and, 2. To maximise the social and economic benefits for the UK from this transition." (BEIS, 2017b, p. 10)

The *Clean Growth Strategy* holds that climate change and environmental protection require "higher growth with lower carbon emissions". Indeed, the Secretary of State's foreword enthuses that following the signing of the Paris Agreement, in which "the UK played a central role" (2017b, p. 8):

> "… we want the UK to capture every economic opportunity it can from this global shift in technologies and services" (BEIS, 2017b, p. 3).

Thus, rather than describing clean energy relative to essential greenhouse gas emissions reduction or climate change amelioration, the *Clean Growth Strategy* emphasises opportunities for industry, affordable energy and reduced energy costs. Through clean energy and climate data, climate change emerges as an opportunity for international competitiveness and local productivity. Even the challenges of climate change are invariably framed economically, that is, in terms of meeting carbon budgets and expanding the low carbon economy, rather than relative to other numerous complexities of climate change mitigation and adaptation. Thus, the policy landscape enables climate change and responses to it being understood in relation to international markets, in a context of global economic growth and dependent on techno-scientific solutions tied to energy, carbon and industry.

6.5.2 Education: multiple neoliberally aligned aspects

Alongside the economic 'opportunity' of climate change, the positioning of education also reflects neoliberal values. These values are evident in the ways that

education, economy and employment are linked, the way performance is accounted for, and in the way that science is dominant in the curriculum.

6.5.2.1 Education for economic growth through employment and skills

In the international policies, the links between climate change-related education tend to be wedded to sustainable development and thus, tied to an economic discourse (as discussed in Chapter 3). For instance, Goal 4 of the *Sustainable Development Goals* (Quality Education) highlights education as a pathway for *all* learners to "promote sustainable development" and the *Doha Work Programme* directs educational effort towards sustainable development, individual change and adaptation. Reflecting Kopnina's (2020) critique of UN Education for Sustainable Development Goals (ESDG) publications, such unequivocal alignment with growth neglects any curricular requirement to reflect critically on economic growth or human consumption patterns; such an absence implies that responsible citizenship does not require doing so.

The economic orientation of education in international policies is also strongly tied to employment. For instance, the *UNFCCC* identifies "training of scientific, technical and managerial personnel" (UN, 1992, art. 6, para. (a)(iv)) as a focus of climate change-related education and the *Doha Work Programme* calls for 'training' for climate change for "groups with key roles", led by "scientific, technical, managerial" expertise, followed by "journalists, teachers and community leaders" (UN, 2012, Annex C). In a similar vein, the *SDGs* describe the importance of education for "employment, decent jobs and entrepreneurship" (United Nations, 2015, Goal 4.4), and climate change-related education as linked to techno-scientific programmes:

> "… enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries" (UN, 2015b, Target 4.b)

Similarly, training and skills receive more attention than education and learning[9], with teacher education commonly being referred to as teacher training (UN, 2012; United Nations, 2015), thereby according with the national policies that frame beginner teachers as "trainees" (DfE, 2011).

The connection between climate change-related education and employment is also evident in national policies. Here, the BEIS strategies - *Industrial Strategy* and *Clean Growth Strategy* - are noteworthy. In the absence of climate change education policy, education ministries might deflect responsibility for climate change responses towards BEIS because of BEIS' responsibility for the education-related aspects of *UNFCCC*. These two BEIS strategies acknowledge (to a limited degree) education as part of climate change response, whilst also creating the conditions in which such education sits. Here, I focus on the *Industrial Strategy*, which, like the *Clean Growth Strategy*, positions climate change and education unequivocally within an economic discourse. This strategy's vision of "a Britain fit for the future" (BEIS, 2017a, p. 1) foresees "good jobs and greater earning power for all" (ibid. 2017a, p. 14) by boosting productivity and investment in "skills, industries and infrastructure of the future" (ibid. 2017a, p. 12). The strategy invokes an internationally competitive leadership discourse that is, of the "world's most innovative economy" and a "world-leading knowledge economy":

> "We will invest strategically in technologies and ideas closer to the market that drive UK competitiveness, while also continuing to fund the curiosity-driven research that is fundamental to the quality of our work and ensures our place as a world-leading knowledge economy." (BEIS, 2017a, p. 67)

The *Industrial Strategy* also positions higher education as an internationally competitive market, boasting that "the UK has one of the most accomplished higher education systems in the world" (ibid. 2017a, p. 100), serving employer and industry needs on one side, and student (customers) on the other. In this context, education's role in responding to global climate change is omitted. Interwoven through the discourse of economy, competition and international leadership are STEM and science. That is to say, the *Industrial Strategy* champions economic transformation

[9] For example, the Doha Work Programme includes 33 mentions of training and skills (24 training and 9 skills), versus 19 of education, whilst the Industrial Strategy includes 259 of training and skills, and 137 of education.

through STEM-related research and development, where business and universities work together to "innovate and commercialise research" (ibid. 2017a, p. 79). As discussed below (Subsection 6.5.2.3) and explained further elsewhere in the thesis, science has dominated conceptualisations of climate change education, previously and amongst contemporary position-holders, yet the *Industrial Strategy* makes little of such a potential link. It's science and STEM-related discourse is more prominently linked to economic growth and employment. The *Clean Growth Strategy* similarly couples the competitive market-based economy with the pursuit of skills shortages, particularly digital, computing and construction, and research for science-based innovation. This strategy describes the role of the higher education regulator, the Office for Students (OfS), as meeting future skills demands and the needs and expectations of employers and students through STEM graduates for the purpose of productivity, as follows:

> "By encouraging innovation and a focus on student outcomes, the OfS will drive improvements in productivity and support the wider economic needs of the country. This will increase the number of work-ready graduates, including in STEM, and promote innovative ways of learning." (BEIS, 2017a, p. 101)

When viewed as individual instances, the highlighted extracts could be construed unproblematically; indeed, some instances seem eminently appropriate given the emphasis of the individual policy. For example, when viewed through a social justice lens, the international policy focus of economic participation coupled with an ambition for equal access to education is a worthy ambition. However, what is of concern is that in the absence of a clear policy home, the suite of policy texts establishes the conditions amongst which climate change education emerges. The consistent orientation of education relative to economic participation and employment, most commonly towards techno-scientific and managerial perspectives that imply reproduction of facts and skills, frames what education can be. Sitting alongside the economic orientation of climate change, and in the absence of alternatives, climate change education can thus be viewed in the above terms.

6.5.2.2 Education performance measurement omits climate change

The second key feature of the neoliberal orientation to education relates to an emphasis on performance measurement, and how it bears out regarding climate

change education. As Gewirtz and colleagues (2019) discuss, the global emphasis on performance measurement, as clearly evident in England, is central to how schools are held accountable for the use of public money. Performance measurement is central to a market-oriented approach to education, as it provides the customers, in this case parents, with information upon which they can choose. However, this emphasis has been widely problematised in relation to widening inequalities, 'gaming the system', driving test-driven pedagogy and narrowing of the curriculum.

This research has found that, in several ways, the emphasis on performance measurement evident in the policy landscape also squeezes climate change education out of the picture. To explain, the *Education Inspection Framework* and its offshoot, the *School Inspection Handbook*, drive schools towards being efficient, user-focussed and aiming for perpetual improvement. The *Education Inspection Framework* encourages systematic, direct feedback and assessment, "without unnecessarily elaborate or differentiated approaches" (2019, p. 9), and framing learners who "achieve well" (ibid.). The focus is thus on test and exam results and readiness for "the next stage of education, employment or training" (2019, p. 10). They establish parameters that standardise quality and demarcate what is valued through inspection of the curriculum (which is at the centre), teaching, assessment and management practices – invoking what Ball has termed the "terrors of performativity" (2003) - whilst overlooking other concerns, including the various requirements of climate change education as discussed in Chapter 4. Similarly, the higher education strategy *Teaching Excellence and Student Outcomes Framework* (DfE, 2017b) seeks to improve quality in higher education by generating comparative data that students can use to make choices. Importantly, the notion of quality amongst the reviewed texts omits any reference to the impending climate crisis, climate change or any sort of environmental ethic, even though higher and schools education are two sectors where policy references to climate change might be expected, because of their role in preparing students for their lives ahead. Such disregard of climate change within education policies could be construed as negligent and paradoxical; whilst claiming to be concerned with students' futures, they ignore climate change as part of that future.

6.5.2.3 Curricula dominance of science leaves climate change vulnerable

The neoliberal tendencies are also evident in the curriculum. As highlighted in Chapter 3, environment and climate change-related education have long associations with geography and science education, which, as the following chapters discuss, persist amongst position-holders' perspectives today. This subsection discusses the disciplinary framing of climate change in the curriculum and how the curricula dominance of science, which is consistent with the neoliberal techno-scientific orientation to education (Hursh et al., 2015), bears out upon climate change education. The purpose here is not to question the importance of science education as part of climate change education, nor to question the crucial role of science in understanding climate change processes, issues and responses, but rather, it is to highlight and problematise the dominance of science relative to climate change education.

Analysis found that, across the family of curriculum policies, geography and science curricula include the highest number of direct and indirect mentions of climate change, as set out in Table 5 above. Whilst the number of direct references to climate change does not vary greatly (geography = 2; science = 5), when viewed relative to the emphasis placed on each subject in the curriculum, the attention paid to climate change in the science curriculum could be construed as lacking. Specifically, the *National Curriculum KS 1-4* devotes 44 pages to science, only five to geography, and there is no KS 4 geography programme of study, whilst GCSE devotes a combined total of 95 pages to science[10], and 12 to geography. As science is compulsory at GCSE and geography is not, participation rates for the latter are lower. Regarding which, in 2018-19 there were 253,125 Geography GCSE entries compared with 786,830 in Combined Science (Ofqual, 2019) (see Appendix 15). Furthermore, Glackin and King (2020) point out that more hours of weekly curriculum time are devoted to science than geography and whilst many schools start GCSE study in year 9, many students might only study geography for two years. Thus, given that students spend more time engaged in science than geography, greater responsibility for climate change education rests with science. Yet, there are

[10] This figure represents the combined total of *Combined Science subject content* (43 pages) and *Single Science (Biology, Chemistry and Physics) subject content* (52 pages).

relatively few references to climate change in the science curriculum and as discussed in Section 6.3 above, those instances are problematic.

Here, I pause briefly with two reflections concerning how the neoliberal alignment of education affects climate change in the curriculum. First, the already limited references to climate change in the curriculum are at risk of being dropped due to the emphasis on performance measurement in England, specifically in relation to exams. Regarding which, in England, exam specifications are written and administered by non-government awarding bodies (e.g. Assessment and Qualifications Alliance [AQA], Pearson Edexcel and Oxford, Cambridge and RSA Exams [OCR]). The specifications are based on Department for Education subject content and whilst the awarding bodies have full autonomy over them, they do seek advice from head teachers, subject institutions and societies (e.g. Royal Society of Chemistry, Royal Geographical Society). Consequently, exam specifications vary. To illustrate broadly the variance between awarding bodies coverage of climate change, Glackin and King noted that, for geography GCSE, whilst one exam specification mentioned it four times, another mentioned it six times and a third thirteen times. As indicated earlier (Gewirtz et al., 2019), exam specifications have a trickle-down effect across the school stages and they influence what is taught during earlier years of schooling. Thus, the emphasis on quality and measurement, coupled with the decentralised approach to exams (all attributes of a neoliberally aligned education system), further undermine student opportunities to engage in climate change content.

A second reflection concerns the role of curriculum policy as part of society's climate change response. According to Young (2013), the curriculum looks backwards to what has been thought and said. Hence, while climate change policy needs to address now and the future, the curriculum, as a backwards looking policy, can make a vital contribution to society's climate change response. That is, the curriculum is uniquely positioned to draw attention to knowledge regarding the long-term nature of climate change causes and responses. To explain, the *National Curriculum KS 1-4* claims to represent "the best that has been thought and said" (DfE, 2014d, p. 6) and to prepare students for their adult lives. Since the introduction of the first national curriculum in England in the *Education Reform Act 1988,* knowledge relating to climate change has expanded. The devastating effect of human activities on the planet and its inhabitants is now well-understood, as is the

need for humans to make significant changes in order to reverse this trend. Thus, when viewing what constitutes 'the best' through a Foucauldian lens, insight is gained into what is sayable about climate change education and thus, where power is wielded. Although the curriculum is a uniquely positioned policy that can draw attention to knowledge about the long-term causes and consequences of climate change, knowledge about climate change retains a low profile in the curriculum, and that concerning responding to it is largely absent. Arguably, this prompts questions about who decides what is sayable in relation to 'the best'.

6.5.3 The natural environment: appropriated and disconnected

The third element that I discuss in relation to neoliberal values, is the natural environment. As explained hereunder, the analysis identified that the policy landscape tends to describe the natural environment in economic terms and anthropocentrically oriented. Moreover, it is only weakly connected to education, thus resonating with Washington's assessment:

> "much official educational policy - including that which relates to the environment - makes scant reference to nature and shows a largely analytic/instrumental/invasive rationality" (2018, p. 1).

Such tendencies normalise framings of the natural environment, interacting with and reinforcing the neoliberal values associated with climate change and education. In Foucauldian terms, these tendencies constitute the conditions that regulate what can be thought and said about the natural environment.

6.5.3.1 Economically appropriated and anthropocentrically oriented

In international and national policies, the natural environment has tended to be afforded economic properties that resonate with Hursh and colleagues' description of neoliberalism, that is, of "political and economic rationalities of neoliberalism (that) transform environmental issues into economic ones" (2015, p. 308), thereby offering seemingly apolitical technological and market-based solutions to socio-political constructions. The international policies include descriptions of the natural environment in resourcist terms, such as greenhouse gas "sinks and reservoirs" (UN, 1992, Preamble), with this tendency being particularly prominent in national climate change and environment policies. Here, the natural environment

is monetised as a 'bio-economy' (*Clean Growth Strategy*) or, more commonly, as 'natural capital' (*The Industrial Strategy*, *Clean Growth Strategy* and the *National Adaptation Programme*). Natural capital is described as an approach to "ensure that we take account of all the many benefits our environment provides" (DEFRA, 2018b, p. ii), thereby presuming that these can be accounted for in economic terms. Evidence of the devastating effect of perpetual economic growth on the natural environment is swept aside, for instance, in the *25 Year Plan's* aspiration to ensure "that our consumption and impact on natural capital are sustainable, at home and overseas" (DEFRA, 2018a, p. 125). A sentiment that is reinforced by the Prime Ministerial Foreword to the *Clean Growth Strategy*, which succinctly dismisses any potential concerns about the links between the natural environment and the government's economic ambition:

> "This Government is determined to leave our natural environment in better condition than we found it … There is no conflict between this aspiration and our plan to create an economy that works for everyone." (BEIS, 2017b, p. 2).

The disregard of environmental values, in preference to economic drivers, is particularly concerning within BEIS policies given what is known about the links between industry and causes of climate change and given BEIS' responsibility for climate change response. For instance, the *Industrial Strategy* celebrates the contributions of the industrial revolutions: the first - mechanised production; second - electric powered production; third - automated production; and the fourth revolution (current) that "is characterised by a fusion of technologies that is blurring the lines between the physical, digital and biological worlds" (BEIS, 2017a, p. 32). The strategy is silent when it comes to the associated environmental harm and changing climate. Indeed, the 'natural environment' is not mentioned at all.

Alongside and interrelated with the economic orientation is an anthropocentric orientation ascribed to the natural environment. This anthropocentrism could be considered indicative of a human "arrogance" regarding the natural environment (Kopnina, 2015; Orr, 2017), whereby it overlooks the rights of 'more than human' species. This tendency is particularly pronounced in national policies, for instance, the *Industrial Strategy* states that "we owe it to ourselves and future generations to lower carbon emissions and move towards cleaner growth" (BEIS, 2017a, p. 32). It also frames the natural environment as a hazard for humans:

> "We are setting high standards in cyber and climate change resilience for our projects across the UK, which will give us greater security and protection from natural risks, and can be the basis for a successful industry exporting these services." (BEIS, 2017a, p. 134)

The anthropocentric framing is also evident in the two reviewed policies that are explicitly orientated towards the natural environment: the *Environment Bill Policy Statement* and the *25 Year Plan*. The proposed *Environment Bill*[11] positions climate change relative to public health alongside the natural environment:

> "The case for tackling biodiversity loss, climate change and environmental risks to public health is clear. The accelerating impact of climate change in this country and around the world is of profound public concern, as is the damage to nature with species loss, habitat erosion and the disappearance of cherished wildlife." (DEFRA, 2020)

The *25 Year Plan*, which begins by promoting conservation of the natural environment, for "cleaner air and water; thriving plants and animals; cleaner, greener country for us all" (DEFRA, 2018a, p. 4), goes on to describe conservation relative to humans deriving benefits *from* natural resources, more so than to benefit more than human species. For example, Chapter 3 is entitled "Connecting people with the environment to improve health and wellbeing" (DEFRA, 2018a, p. 71). The human health and wellbeing benefits of conservation and participation in the natural environment reflected elsewhere (*Industrial Strategy* and *National Adaptation Programme*) accord with a need to get people back to work and participating in the economy. That is, the health and wellbeing of the individual, sit alongside the promotion of entrepreneurialism and consumerism (Huckle & Wals, 2015), with the measurement of performance engendering a 'hyper-individualism' that aligns with neoliberalism (Hursh et al., 2015). Hence, the natural environment is diminished to a resource for human benefit and political obligations to act on climate change can be met from within a discourse underpinned by economic growth.

Not only have conceptualisations of the natural environment been appropriated for economic and anthropocentric means, the analysis has also found that the terminology has been appropriated in ways that, arguably, leads to further

[11] At the time of the analysis (February 2020), the *Environment Bill* had reached a second reading in parliament. Its progress then stalled during the COVID-19 pandemic.

diminishment of the natural environment's significance. While I did not conduct a linguistic analysis, as I reviewed the policies, I was alert to previous criticism by Jickling and Wals (2008) of insufficient recognition of fundamental elements of environmental education, namely 'environment', 'environmental', 'ecology', or 'ecological'. I was also aware of Vare's (2019) analysis of co-opting the language of sustainable development and massaging it into meeting certain ends. Accordingly, I found that although there were many references to 'environment' dispersed across the national policy landscape, 'environment' was most commonly employed to describe environments other than the natural environment: learning environments, business environments, safe environments, and so on. Indeed, out of 181 mentions of 'environment' in *Building Bulletin 101* (a 161 page document setting out guidelines on school air quality) only three related to the natural environment, with each of these relating to pollutants generated outdoors and their effects on "health and the environment" (ESFA, 2018, p. 96). Similarly, 'sustainability', which as discussed in Chapter 3, had been dominant in the 2000s was assigned ambiguous or alternative meanings, such as "financial sustainability" (Higher Education and Research Act, 2017) or "business sustainability" (*Industrial Strategy*).

Thus, the combination of economic and anthropocentric appropriation of the natural environment, coupled with the absence-come-appropriation of (the natural) 'environment', has allowed these terms and concepts no longer to relate to or prioritise the natural environment for its own sake. Drawing on Stevenson's discussion of the appropriation of sustainability and sustainable development, omitting the environment "both literally and in practice" (2013, p. 150) from the climate change education policy landscape, enables policy problems and solutions to be framed in ways that do not favour the environment. As has been highlighted elsewhere, given human-caused climate change has human-based consequences and that education is a human endeavour, a level of anthropocentricity is understandable (S. Gough et al., 2000; Todd, 2016). Moreover, it might even be useful, for an anthropocentric orientation might mean doing *something* and a more than human orientation could follow. Nevertheless, the centrality of the natural environment to life on earth requires, at the very least, clear and frequent acknowledgement and valuing of other species even within an anthropocentrically oriented policy landscape.

6.5.3.2 Disconnected from education

The final tendency concerns the disconnection between the natural environment and education. As previously discussed, education is framed in the policy landscape relative to the economy in multiple ways. In so doing, education is *not* positioned relative to the natural environment, indeed, the two are largely disconnected.

To elucidate further, I first turn to education policies focused on the management of education and where the natural environment is largely absent. Neither the *Teachers' Standards* (DfE, 2011) nor the *Education Inspection Framework* require or encourage schools to connect with or advocate for the natural environment, instead, they emphasise individual benefits of education: discovering interests and talents; physical and mental health; preparation for the next level of education or employment; and safety. There is some advocacy for children's engagement in the natural environment from non-education ministries, for example, the *25 Year Plan* encourages "nature-friendly school grounds" (DEFRA, 2018a), reflects on the benefits of nature for health and wellbeing, particularly for disadvantaged people and promotes learning about nature through fieldwork (DEFRA, 2018a). However, these instances are limited to environmental education 'for' human benefit and education 'about' the environment. Furthermore, in contrast with Washington's (2018) advocacy for naturalised schoolyards with native trees, shrubs and groundcovers, where children can play in unsupervised ways, develop their own games and enhance learning and creativity, the *Area Guidelines* for school grounds include a recommendation to separate pupils from the natural environment with advice that habitat areas should "generally be fenced to avoid unsupervised access" (DfE & EFA, 2014, p. 40). Additionally, and cross-referenced in the *Teachers' Standards*, *Education Inspection Framework* and the *National Curriculum,* is the requirement for students to demonstrate Fundamental British Values. These values are based on a strategy developed in response to political extremism (the controversial *Prevent Strategy* [2011]) and make no reference to the natural environment or to climate change.

In the curriculum, the natural environment appears as something that students learn <u>about</u> rather than <u>for</u> (Lucas, 1972), for instance, the aims of *GCE AS and A Level Geography* state:

> "Students should grow as independent thinkers and as informed and engaged citizens, who understand the role and importance of geography as one of the key disciplines relevant to understanding the world's changing peoples, places and environments." (DfE, 2014b, p. 4)

Similarly, the purpose of study for science in the *National Curriculum Key Stage 1 – 4* draws attention to "the world's future prosperity" and leaves the natural environment unspecified, opening as follows:

> "A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science." (DfE, 2014d, p. 168)

The alignment with an economic vision is similarly reflected in the *GCE AS and A Level Subject Content for Economics*, which describes markets as being affected *by* (rather than affecting) the environment (DfE, 2014a). When viewed in the context of individual subjects, such statements are reasonable; however, the curriculum does not include a corresponding future-focused narrative relating to the natural environment. Even the aims of *Environmental Science GCE AS and A Level* seem to fall short on establishing pro-environmental aims and instead, concentrating on developing skills and knowledge about the environment so students can develop an interest in careers and further study. The area of study is described as leading to "understanding how society makes decision about environmental issues and how these contribute to the success of the economy and society" (DfE, 2015d, p. 3). Moreover, student participation in or advocacy for the natural environment is overlooked. One seeming anomaly is *GCSE Design and Technology Subject Content*, which encourages contemplation of the environment:

> "The study of design and technology seeks to prepare students to participate confidently and successfully in an increasingly technological world; and be aware of, and learn from, wider influences on design and technology, including historical, social/cultural, environmental and economic factors." (DfE, 2015c, p. 4)

Yet, the Design and Technology references are situated in the context of a "technological world" that aligns with industry and economic growth, where "computational thinking and creativity (will) change the world" (DfE, 2014d, p. 230). As the purpose set out in the GCSE subject content makes clear, Design and Technology is important for "creativity, culture, wealth and well-being of the nation" (DfE, 2014d, p. 234) not, for argument's sake, 'living sustainably' or 'living in harmony with the natural world'. The point here is not to contest the legitimacy of each of these examples in isolation, but rather, it is to highlight that, when viewed as a whole, the curriculum positions the natural environment as a resource or something to learn about. It does not offer a pro-environmental future vision, draw attention to the destructive impact of humans upon the natural environment, how these impacts correspond with the climate 'crisis', or indicate that anything needs to change.

This section has identified several ways that neoliberally aligned values have permeated the policy landscape in ways that had a bearing on climate change education. That is, the policy landscape is underpinned by an untroubled goal of economic growth. Climate change is framed in economic terms, whilst education is positioned in accordance with neoliberal values, that is, as economically oriented and wedded to employment and skills agendas. Moreover, performance measurement omits considerations of climate change, and techno-scientific understandings of the phenomenon dominate the curriculum. Furthermore, the natural environment is economically and anthropocentrically oriented, and is largely disconnected from education. The overall economic orientation that underpins global and national policies helps to explain why climate change amelioration is repeatedly subordinated to other priorities. In the absence of a climate change education policy, the values that permeate the landscape become the conditions in which such education can emerge. In Foucauldian terms, these values create rules and regularities that are reproduced and left unchallenged across the landscape, that work in concert with other complementary rules and regularities, whilst squeezing out alternatives. Meanwhile, the requirements of climate change education, as discussed in Chapter 4, such as education supporting multiple knowledges and open-ended outcomes, are silenced.

6.6 Summary

Summing up, this chapter has described four features, or interplaying issues, that permeate the reviewed climate change, environment and education policies. First, climate change education lacks a clear policy driver in England, indeed, there is a hole in this landscape where England's school education response to climate change should be. Thus, mirroring Glackin and King's call, a clear statement of purpose for climate change education that is "reflected in the round" (2020, p. 15), that is, across government ministries and within policy texts, is called for. I return to this in Chapter 9. The policy landscape also overlooks the 'crisis', for its alignment with neoliberal values orients climate change, education and the natural environment towards the economy. The bedrock of the landscape is an unquestioned need for global economic growth, with the climate crisis being hushed, and the natural environment being appropriated for human purposes. Responses to climate change are primarily positioned as techno-scientific or industry aligned, and education, situated within a market, is a pathway to work and economic participation with minimal regard for climate change or the environment. The most salient policy lever in schools is the curriculum and yet, it falls short. When viewed as individual instances, it might be justifiable that each policy focuses as it does. When viewed collectively, it becomes clear that the attention of the policy landscape is directed elsewhere. The analysis thus prompts questions about whose interests the policies serve, in what ways and why (Gale, 2001). Whilst the various failings of the policy landscape are troubling and there are no easy answers, shining a light on these problems is helpful. As Ferreira (2009) contends, it is only by illuminating these problems that we are able to think differently about them. Alongside the findings of the following two chapters, those presented in this chapter provide insight into factors that are governing climate change education and possible pathways for change.

Chapter 7. Conceptualising Climate Change Education: the position-holders' perspectives

7.1 Introduction

Recent civil action has called for 'more!' climate change education. Whilst such calls are warranted in view of the findings of the previous chapter, in response might well come the retort 'of what?'. As discussed in Chapter 4, perspectives from the environmental education literature indicate that climate change education defies straightforward definition. Where definitional clarity is lacking it can be difficult to agree to policy solutions. Such a lack of clarity is not unique to climate change education, and is a matter that Foucault has explored in relation to various "programmes of conduct" (1991c, p. 75) or "entities". Foucault explains:

> "When one speaks in the singular of [climate change education], what is one speaking of? What are these curious entities which one believes one can recognize at first glance, but whose limits one would have some difficulty in defining?" (Foucault, 1991b, p. 54)

Hence, this chapter's examination of position-holders' perspectives of climate change education provides further insight into the ways that the 'entity' is understood. When coupled with the previous chapter's policy analysis, these findings enable me to address RQ1 in the Discussion (Chapter 9):

> RQ1: How is climate change education positioned in England's policy landscape and amongst position-holders?

Position-holders' perspectives on what climate change education is or should entail, were diverse. As they discussed the 'what', they reflected on macro-level matters, such as the broad purpose of education, and meso-level ones, such as policy and curriculum. Individuals' views were informed by juxtaposing macro and meso concerns, and were considered in relation to their professional contexts. As discussed in the Methods (Chapter 5), the diversity that emerged amongst the perspectives can be understood epistemologically in that they were indicative of how individuals interpret their worlds based on their context (Cornell & Parker, 2010). However, the complexity amongst the perspectives makes it difficult to define 'what' climate change education is, let alone to know how to implement 'more!' of

it. Hence, this chapter seeks to make sense of the diversity and complexity by organising macro-level views on the purpose of education in the context of climate change and meso-level ones on what climate change education is or should be into three nested conceptualisations of climate change education: *Climate Change Education for Knowledge*, *Climate Change Education for Capabilities*, and *Expansive Climate Change Education.* The chapter begins, in Section7.2, by introducing the conceptualisations and how they fit together. Sections 7.3, 7.4 and 7.5 then discuss each conceptualisation in turn, by examining their ontological bases in the data and in relation to one another, the policy analysis and the literature.

7.2 Climate change education matters, but what is it?

The majority of the position-holders (23 out of 24) were clear in their views that school education should be part of society's response to climate change (the outlier was uncertain, rather than opposed). However, the participants did not simply suggest that schools do 'more', indeed, there was widespread concern that schools are already expected to do too much, explained as follows:

> "I just think … we're putting too many of society's problems on schools. I just don't think they've got capacity." (Ambrosia)

Beyond this near consensus, numerous difficult questions were raised: which strategies are the most effective responses to climate change (Faith)?; what does society need from education (Edmond)?; what outcomes or change could be expected because of 'climate change education' (Alannah, Chris) or of education more broadly. As Ada queried:

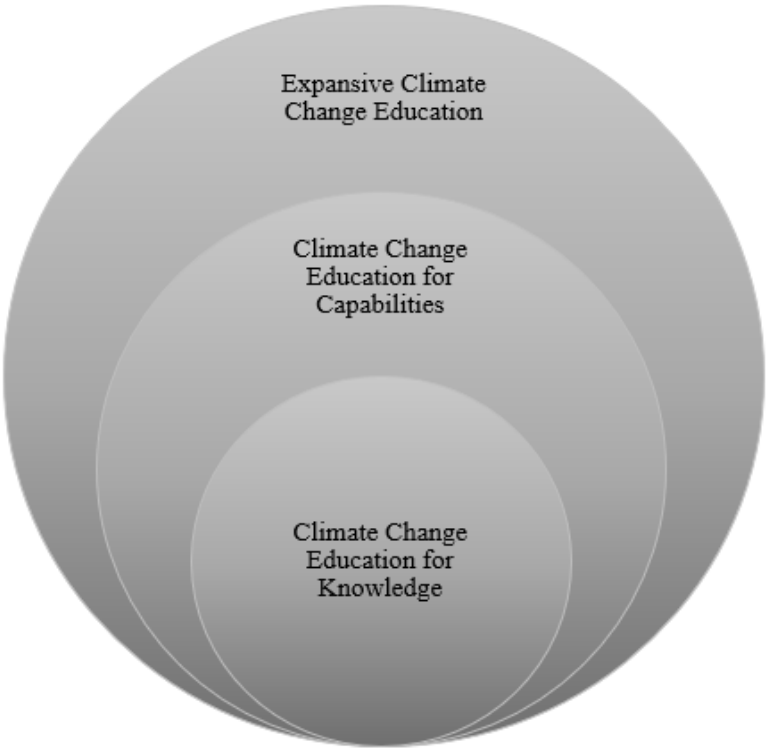
> "You know, I said the scientists have a misleading theory of change, which is like, here's the facts and then the decision gets made. Maybe we [referring to people working in education] have a misleading theory about change as a result of education as well?" (Ada)

Thus, beyond a level of concordance that schools have a role to play in climate change education, diversity and complexity flourished amongst the perspectives.

Guided by Braun and Clarke's thematic analysis (V. Braun & Clarke, 2006, 2019; Clarke & Braun, 2013) I organised this diversity and complexity into three nested conceptualisations of climate change education. These capture an analysis of

position-holders' perspectives, rather than of individual participants. Whilst participants might choose to align themselves with one conceptualisation over another, they (as manifested in the transcripts) were not neatly categorisable and their perspectives on climate change education were not always internally consistent or well-defined. Thus, I considered that more useful insight was to be gained by grouping ideas rather than grouping people. This approach is consistent with the research methodology, whereby an architecture of policy positions is more interested in what is said than who is speaking (Gale, 2001). As illustrated in Figure 2 below, the conceptualisations can be visualised as a nested Venn diagram with the outer rings incorporating those within.

Figure 2: Nested conceptualisations of climate change education



Briefly, the inner-most conceptualisation – *Climate Change Education for Knowledge* – orients climate change education principally around disciplinary knowledge and skills, thereby correlating with the current approach to formal education in England. The second nest – *Climate Change Education for Capabilities* – positions knowledge and skills as fundamental, but it is associated with a purpose of education oriented around the opportunities education provides beyond knowledge attainment. The outermost nest – *Expansive Climate Change Education* –

embraces knowledge and skills, and capability development, whilst also encapsulating a broader, more expansive conception of climate change education. Coupled with other perspectives from the literature, such as those explored in Chapter 4, this original heuristic potentially supports the critique of current approaches to climate change education or the envisaging of alternative ones.

At a glance, the absence of a conceptualisation reflecting environment-related education (or sustainability-related education) might seem a notable omission given the positioning of this research within this field. However, whilst many participants made reference to sustainability-related education (or similar, and rather than environmental-related education) the analysis revealed that the connections with climate change education were both contentious and muddled to the point that sustainability or environmental education did not emerge as a helpful organising device. For instance, some participants explained that they were comfortable conflating sustainability and climate change education, whilst others did so during conversations. Some participants clearly distinguished between sustainability and climate change, positioning the former as a higher order concern for education and society, and the latter as a sub-category within 'Learning for Sustainability'. Others, who were concerned about conflating the terms tended to criticise sustainability-related education: as campaigns or activism (discussed in Subsection 7.5.3.2 below); as "anti-educational" behaviour change (Edmond); and for being emotive or moralising and obscuring scientific facts with an "analytically incorrect … deprivation discourse" (Hugh). Whilst views relating to environment or sustainability education were often part of participants' conceptions and are integral to the three conceptualisations described below, the contested and muddled nature of perspectives meant that neither environmental nor sustainability education were helpful analytical devices. Moreover, the lack of a conceptualisation makes sense to the extent that, as Orr has argued, "all education is environmental education - what is included or excluded teaches that we are part of or apart from the natural world" (2004, p. 12). The rest of the chapter describes each of the conceptualisations, with reference to the literature, and reflection on their ontological bases.

7.3 Climate Change Education for Knowledge

At the centre of the heuristic device is *Climate Change Education for Knowledge*, a conceptualisation that, as the title suggests, positions fact-based

knowledge and disciplinary learning centre stage. In various ways, perspectives shared by 20 participants coalesced here. This conceptualisation orients school education around a disciplinary curriculum and, in accordance with the findings of the policy analysis, it situates climate change education primarily in the disciplines of geography and science.

Broadly speaking, a knowledge-based education led by disciplinary knowledge and skills, was regarded as potentially transformative for students and society in the way that it creates opportunities for students. As Edmond commented, education should introduce young people to a "world of knowledge that takes you beyond your everyday life" (Edmond) such that students might use the knowledge to "… go into society, reflect on that understanding and have the capacity to change it in the direction that they see fit". He explained further:

> "There's everyday life and then there's another world - that's knowledge - that takes you beyond that and gives you insight to culture and deeper understanding of things, whether that's scientific understandings, whether that's artistic understandings, um, and historically, that's what schools have been for. To induct children into a different kind of life." (Edmond)

While some perspectives advocated a knowledge-based purpose for education irrespective of climate change, others emphasised it *because* of climate change. For instance, Ada argued that knowledge was crucial for creating social change in response to climate change:

> "If you're thinking about large scale action of climate change and really changing how society operates, you need to have people understand it and be on board with it." (Ada)

In a similar vein, a knowledge-led approach was advocated, because it enabled students to become informed participants in society and to make choices about responding to climate change:

> "[That] epitomises the value of education. You're taking young people and giving them information, and you're equipping them for the ability to take part in discussions … It's particularly critical on climate change, because most of the long-term consequences of climate change are things that, it's not adults, but it's today's children who are going to have to deal with it." (Hugh)

Thus, this conceptualisation positions knowledge as central to the purpose of education in the context of climate change, and as central to climate change-related education.

These perspectives tended to frame knowledge in terms of disciplinary knowledge, skills and thinking, and in relation to the disciplinary subjects that constitute the curriculum. Disciplinary knowledge, skills and thinking were perceived as powerful lenses for understanding the world, for instance:

> "Disciplines are not just knowledge, they're a way of thinking, ok? And you're teaching someone to think as a geographer thinks … so the end point of education should be that the student becomes more independent and be able to think in a disciplined way." (Edmond)

Disciplinary subjects were also considered fundamental for understanding climate change, for instance:

> "We need to, within the curriculum, stipulate more clearly the aspects of climate change, which children for science, for chemistry, physics and biology need to know and understand … (and) the interconnectivity and the possibilities to bring the sciences, and beyond the sciences, into geography and into mathematics." (Molly)

Resembling the attention paid to climate change in the curriculum, geography-based framings (evident in the perspectives of 6 participants) and science-based framings (evident in the perspectives of 15 participants) dominated discussions of what climate change education is or should be. This tendency chimed with the findings of the policy analysis concerning the curricular dominance of science and the techno-scientific discourse associated with climate change. It also resonates with the prevalence of climate change education research arising from STEM and science education. Indeed, Rousell and Cutter-Mackenzie Knowles' systematic review of climate change education research literature found that "nearly half of all publications specifically referred to scientific knowledge and cognitive understandings as the primary approach towards climate change education" (2020, p. 202). In the case of this research, it was remarked upon that geography was the current curricular home - "I guess geography has it at the moment" (Ellen), whilst climate change education was more frequently discussed in terms of science

education. That said, the spread of views between geography and science indicates that climate change education lacks a clear-cut home, a situation that has persisted for environmental education since the 1960s. Hereunder, I unpack the conceptualisation by focusing on key tendencies that were identified amongst geography-aligned and science-aligned perspectives. This is followed by a critical reflection on 'what counts' as knowledge in *Climate Change Education for Knowledge* conceptualisation.

7.3.1 Geography tendencies

Perspectives that construed climate change education in terms of geography highlighted a range of related knowledge and skills as relevant to climate change education (see Appendix 16). Indeed, Scott describes stage one of his proposed three stage climate change curriculum as "pretty uncontroversial geography" (2019a, no page). Beyond such knowledge and skills, four notable emphases were observed amongst the perspectives. First, was a strong emphasis amongst these participants concerning the importance of knowledge (more so than skills), particularly knowledge sequences, or "building blocks" (Rex). Second, was a notable emphasis placed upon the need for optimism in geography education, for instance, that it should help people view the world as "amazing" rather than "terrible" (Rex), to use the changing climate "as an opportunity, not as a threat, built on innovation" (Callie) and that geography should not become a "dumping ground" for problems:

> "… done wrongly, geography could just be a litany of the four horses of the apocalypse, you know? Climate change, natural hazards, running out of resources blah blah blah … and you leave young people with a sense that everything's going to pot." (Rex)

Whilst consideration of student emotions as they learn about climate change, such as the concerns raised by these and other participants and has been explored in the literature (e.g. Ojala, 2012a, 2012b), is important, this does not necessarily mean that negative emotions should be avoided. Indeed, education should support students in confronting the inevitable anxiety associated with climate change education, albeit, without allowing pessimism to take hold. As Pihkala (2017) has remarked:

> "Despair and 'doom and gloom' must not have the final word, but still the problems have to be faced. The prevailing attitude in EE writing is right in

> emphasizing positive matters and empowerment, but the relation between hope and optimism must be carefully thought about and a certain sense of tragedy must be included." (2017, p. 114)

The third emphasis was a tendency to stress the importance of geography more than that of climate change. That is, geographical lenses and becoming 'geographically literate' were described as important, because of what they enabled. For instance, geography helped to facilitate "conversations about our relationship with our environment" (Edmond) and to enable people to "think about the spatial, people, places and the environment" (Rex). Being geographically literate was considered useful for helping people understand climate change alongside other issues. The emphasis on an optimistic narrative coupled with that on the importance of the discipline of geography seem to have promoted the subject in a way that echoed with the 'legitimising' and 'salvation' narratives that have previously been associated with environmental education (Berryman & Sauvé, 2013). Whilst such a tone is understandable, whereby subjects compete for students and geography has a lower profile than science in the curriculum (as discussed in Chapter 6), such emphases can result in important complexities associated with climate change being overlooked. Furthermore, views such as Callie's above chime with the economic opportunism of the national climate change policy landscape, whilst simultaneously quietening the climate crisis. In so doing, they arguably adopt a discourse that is perpetuating it (Jickling & Wals, 2008).

Fourth, position-holders who were represented in this category tended to express a general level of contentment with how climate change was addressed in the curriculum. For instance, Edmond deemed implicit references to climate change in the curriculum and exam specifications to be sufficient and went on to assert that GCSE exam boards overemphasised issues rather than knowledge. Each of these participants also criticised earlier incarnations of climate change-related and sustainability-related education and activism and gave no indication that they were planning to advocate for curriculum change (discussed further in Chapter 8). Given that the curricular 'home' of climate change is currently in geography, these perspectives are cause for concern if more climate change education, or alternative conceptions thereof, are to be realised.

7.3.2 Science tendencies

Perspectives that framed climate change education in terms of science generally positioned science as helpful for developing students understanding of their place in the world, for example:

> "To be able to think like a physicist, to have the skills and the competencies of physicists, enables you to understand those big questions about physics and our place in the universe and how the universe operates." (Molly)

Scientific knowledge and skills, including the inherent uncertainty of science, were perceived as crucial elements of climate change education in the ways they helped students to understand climate change within the world. Whilst a wide range of science-related knowledge and skills was highlighted as important (see Appendix 16), views were principally framed in relation to the disciplines of chemistry, physics and biology, thereby mirroring England's curriculum. Despite the science curriculum drawing attention to "uncertainties in the evidence" (DfE, 2014d, 2015a), six participants stressed that scientific concepts relevant for teaching climate change in school years were settled, for instance:

> "Cold hard facts guide you towards a conclusion that climate change is inevitable. Is real. Now, that is the core to start with." (Theo)

> "I don't think it's the case of making a theoretical argument of climate change is a thing. I mean, that's agreed. There's consensus." (Jon)

What was particularly noteworthy amongst the science-based conception of such education were the multiple criticisms that illustrate potential shortcomings of a science-based framing of climate change education. Four key areas of criticism arose, set out hereunder.

7.3.2.1 A scientific framing is limiting

The first area of criticism relates to the suitability of a scientific framing for climate change education. Amongst the science-based perspectives captured here, participants were concerned with the potentially delimiting effect of a scientific framing regarding who should act on climate change, for instance:

> "Is climate change something that should be taught in science or … does that risk pigeonholing it to something that only people who do science have to worry about?" (Ambrosia)

> "And just not saying this is a problem of science and if you don't take science then forget it." (Ada)

Similarly, concern was raised that by situating climate change primarily within the science curriculum (and ignoring it elsewhere), education could carry some responsibility for promulgating a misconception that climate change was a problem for science, as follows:

> "So that's why education is interesting, because, it's like, where does that misconception come from?" (Ada)

As the policy analysis revealed, the 'misconception' that climate change is a problem for science is reflected in the techno-scientific framing of the phenomenon across the policy landscape.

7.3.2.2 The science-based curriculum approach is inadequate

A second area of criticism concerned the current science curriculum and a perception that the coverage of climate change is inadequate. Participants commented that it "gets a bit lost" (Ellen) at Key Stage 3, that it was "under-done" in GCSE (Theo), and that the three sciences needed a clearer articulation - "something meaty" (Molly) - of the science. Others argued that even if the science-related aspects of the curriculum were adequate, the curriculum as a whole misses key aspects of climate change, which prevents students from developing understanding of the associated problems and possible solutions concurrently. For instance, Nichola identified shortfalls in relation to climate change response:

> "There's probably nothing, close to nothing about mitigation, adaptation, risk reduction, early warning signs and how you manage it once it has happened." (Nichola)

Ada was expansive as she discussed the need for climate change education to address power and politics:

> "The complexity of decision making, the complexity of national interests, the complexity of political background, the complexity of the relationships between the developed and less-developed countries, the tensions around development, the tensions around what colonialism has done, like, all of those social aspects." (Ada)

Whilst views were mixed about the extent to which 'issues' of climate change should be (and were already) included in the curriculum, several participants perceived that a typical scientific discourse (where science is construed as a factual, objective body of knowledge) was inadequate for addressing the complexity of climate change. That is, that a fact-based science-based (be that science-dominated or science-only) approach to climate change education risked overlooking complexity, messiness and controversy that Scott (2019a) has described as relating to values, socio-economic and political decisions concerning climate change response. González-Gaudiano and Meira-Cartea (2010) have raised similar concerns, criticising transmissive modes of science education that position science as value-neutral, thereby failing to address the socio-cultural and critical dimensions required to tackle the inherent complexity and uncertainty. Furthermore, scientific knowledge-based approaches have been found to be ineffectual when it comes to changing the climate change-related attitudes and behaviour of students (Rousell & Cutter-Mackenzie-Knowles, 2020).

7.3.2.3 The curriculum structure is problematic

A third area of criticism amongst the science-based perspectives related to more general complaints about the curriculum, that it was too: "narrow" (Richard), "pared back" (Molly), "systematic" and "siloed" (Lawrence) to address the complexity of climate change. Such criticisms resonated with the emphasis on subject acquisition across the curriculum that is playing out in school practice, what Todd (2016) describes as a linear model of schooling organised around the provision of testable knowledge and skills, arranged in subjects organised in fixed progressions. Such views sat alongside the advocacy of interdisciplinarity shared by eight participants, because, as Nichola remarked, "… that's how life is anyway. You don't live in silos." As Theo explained:

> "Do you put it in chemistry, do you put it in biology, even in physics or do you put it in geography? ...Well you don't put it in any of them. You put it in all of them." (Theo)

Of note here is that while many position-holders were critical of the disciplinary dominance within school education, their advocacy of 'holistic learning' and interdisciplinarity was, nevertheless, couched in terms resembling the current disciplinary curriculum. That is, interdisciplinarity generally tended to be described as a theme across a sequenced disciplinary curriculum, or as inclusion of climate change related knowledge in a range of disciplines, which indicated that perspectives were somewhat constrained by a curricular understanding of climate change education. Furthermore, amongst the participants was criticism of interdisciplinary approaches, in terms of them being superficial (Josephine) and as poorly linked in schools, such that students "don't even see a connection between the two (subjects)" (Theo). These criticisms highlight the potential risks with climate change education conceptualised as knowledge and skills even when viewed as interdisciplinary, that is, there is a threat of misalignment resulting in students not seeing the connections.

7.3.2.4 Teachers lack necessary knowledge and confidence

A fourth area of criticism amongst the science perspectives relates to the ability of teachers to deal with the conceptual complexity of climate change, in science education and elsewhere. In accordance with several other findings in the research literature (Arslan, 2012; Boon, 2010; McGinnis et al., 2017), participants raised concerns that teachers were fearful and needed help to demystify climate change; that they lacked scientific and factual knowledge, misunderstood controversies; and they lacked knowledge of ethical and moral arguments, for instance:

> "My sense from teachers is they often feel they don't have the knowledge, um, they don't know how to have those conversations [about justice and ethics], because they don't know what to talk about." (Lori)

It was also recognised that requiring teachers to build or teach interdisciplinary knowledge could be regarded as a "challenge" or a "chore" (Richard), leading to increased workloads, lower confidence and having negative impacts on teacher

retention. Furthermore, Alannah wondered whether teachers were being given an impossible task when working in complex school and classroom environments:

> "You're asking a teacher to pull stuff together that top climate scientists and politicians can't do. That's not going to help." (Alannah)

A consistent factor underpinning these four areas of criticism is the complexity associated with climate change. Not only is the complexity tied to what climate change education 'is', but it also extends to individuals' interpretations thereof. Indeed, a survey of 746 science teachers in the US about the opportunities that climate change presents for teaching science found that, "perhaps more than any other environmental topic, climate change is deeply intertwined with political and cultural values" (Monroe et al., 2013, p. 5). Moreover, 63% of the teachers surveyed limited the topic to informal discussions or avoided it, because it had a low profile in the curriculum. Thus, in view of the low profile of climate change in the (science) curriculum in England, teachers' avoidance of the topic because of its complexity places students at greater risk of missing out on important areas of learning. If science education does have a greater responsibility for climate change education than geography, as asserted in the previous chapter, then a more meaningful response will not be achieved simply by adding 'more' knowledge about climate change to the science curriculum.

7.3.3 Reflecting on Climate Change Education for Knowledge

In various ways, *Climate Change Education for Knowledge* accords with the current approach to schooling in England: it is conceived in terms of a disciplinary curriculum, with climate change 'knowledge' being positioned primarily within disciplines of geography and, more commonly, science. Whilst the various criticisms arising from the science-based perspectives reveal the limitations of a knowledge-based approach, reflecting on this conceptualisation also prompts questions about what counts as 'knowledge'.

With reference to Lucas' (1972) descriptions of environmental education, perspectives coalescing here tended to focus on education <u>about</u> climate change, that is, they emphasised knowledge provision, information supply and facts as being of primary importance for climate change education. Disciplinary knowledge and skills as part of climate change education is not in dispute here, and nor is the importance

of science and science education as part of society's response to climate change. Furthermore, I recognise the substantial discussion in the literature exploring broader conceptions of science education relating to climate change education, for example, teaching and learning about the climate system (Shepardson et al., 2012), science education, risk literacy and the limits of science (Ashley, 2000), socio-scientific responses to climate change (Peel et al., 2017; Zeidler & Newton, 2017) as well as other ethical and political possibilities and implications of science education. However, there are two reasons why the emphasis placed on knowledge-based approaches to climate change education are of concern here.

The first reason relates to the potential for limitations to be placed upon climate change education by knowledge-based perspectives. To explain, the belief that increasing knowledge and awareness, in this case about climate change, will lead to changes in attitudes and behaviours, has been refuted in the literature (e.g. Kollmuss & Agyeman, 2002; Wals et al., 2014). So, if climate change education is to lead to change, something more than knowledge about climate change is required. However, this research found a prevalence of knowledge-based approaches amongst individuals in positions of (potential) influence relative to policy, indicating a likelihood that policymaking processes will be informed by such views.

The second relates to 'what counts' as knowledge. Recognising that knowledge and curriculum are enacted and interpreted in context (see related discussions by Ball, Maguire and colleagues [Ball et al., 2012; Maguire et al., 2015]), it is, nevertheless, crucial that, as Lundholm (2019) highlights, critical attention is paid to the potentially limiting effect that advocating certain knowledge types over others can have on what counts as climate change education. A climate change education conceived *primarily* in terms of (science or geography) knowledge could risk reinforcing and normalising certain understandings (and low prioritisation) of the phenomenon relative to other knowledges. As discussed in Chapter 4, climate change-related knowledge reaches beyond disciplinary structures. However, amongst the perspectives captured here was a tendency for climate change education to be construed in terms of disciplines, or what Læssøe and colleagues might describe as "conventional epistemologies" as "a source of objective, reliable knowledge of the world, imparted through segregated academic disciplines" (Læssøe, Schnack, et al., 2009, p. 14). There were views of climate change education as being about "core climate change concepts" presented by reasoned

arguments of climate scientists, "this is what the climate is doing, this is what we're projecting it will do in the future" (Callie), set against criticism of sustainability-related education as 'moralising' and 'anti-educational'. Some voiced concerns about conflating climate change education with sustainability action, about it being "emotive" (Hugh) (implying that emotions are 'out') or related to co-opting people into particular viewpoints:

> "Usually what the problem is, is that people get straight stuck into the controversies about options and it obscures the knowledge… It's the difference between co-opting people into a campaign and empowering them by equipping them with information so they can make well-informed decisions themselves." (Hugh)

Such views, when coupled with the discourses identified in the policy analysis, elevate the status of fact-based knowledge (defined in/by the curriculum), whilst simultaneously questioning the credibility and actively diminishing alternatives, in a manner reminiscent of the dismissal of Carson's argument in *Silent Spring* (1962) (discussed in Chapter 3). In Foucauldian terms (1991b), they provide insight into what can be said correctly about climate change education at this time.

In short, whilst knowledge is important, these findings point to several shortcomings associated with conceptualising climate change education as *Climate Change Education for Knowledge*. Even if more climate change knowledge was to be included in the curriculum, a knowledge-based framing would not automatically amount to a climate change education that provides students with the best chance of responding to the crisis. The next two conceptualisations value knowledge and skills, whilst encapsulating broader perspectives on what climate change education could be.

7.4 Climate Change Education for Capabilities

The second conceptualisation – *Climate Change Education for Capabilities* – captures a purpose for climate change education that is essentially concerned with opportunities for enabling students to live in a context of climate change. Perspectives shared by 18 position-holders are reflected here. As explained below, I found the notion of 'capabilities', understood through the lens of the capabilities approach (Kronlid, 2014; Robeyns, 2005; Saito, 2003; Sen, 1980, 2010), was helpful

for framing a range of views that showed concern for the justice aspects of climate change and their relevance for education as well as for reflecting a purpose for climate change education broader than knowledge.

Briefly, at the heart of the capabilities approach lie considerations about well-being and justice. That is, it is "a theory of justice in a very broad sense" (Sen, 2010, p. iv) that views justice in terms of opportunities that people have to do and become things that they value. People's achievements, that is 'beings and doings', or 'functionings', in capabilities parlance, are made possible because they have opportunities - or 'capabilities' - to do so. Social institutions, such as education, should afford people those opportunities and expand people's capabilities (Saito, 2003). Whilst the capabilities approach distinguishes between potential achievements (capabilities) and actual achievements (functionings) (distinctions that are discussed by Robeyns [2005], Saito [2003] and Kronlid [2014]), for the purpose of this discussion the essence of these perspectives can be captured by adopting the generic term 'capabilities'. Thus, of central concern to a conceptualisation of climate change education viewed through a capabilities lens, are matters of justice and opportunities. This section describes *Climate Change Education for Capabilities* by examining four themes identified in the analysis that the capabilities approach can help to make sense of.

7.4.1 Framed by concerns for justice

The first theme concerns discussions related to justice, which, as discussed in Chapter 4, has been acknowledged as an important requirement of climate change education and as lying beyond traditional disciplinary approaches to education. The capabilities approach provides theoretical resources to help frame a range of perspectives that coalesce here, in part because issues of justice lie at its heart.

Corresponding with the policy review, the participants chiefly framed climate change in relation to humans rather than other species, thereby aligning with social justice concerns. This was evident when discussing the consequences of climate change and responses, for example:

> "Climate change is a humanitarian crisis on the scale that we have never seen before." (Samuel)

> "… human rights abuses and how much we treat one another fairly at the global level… And this is a problem of political decision making and of justice." (Ada)

Relatedly, and resonant with the policy review, there was scant mention of the natural environment, and when it was mentioned, it tended to be discussed relative to humans, for instance:

> "… about talking about human communities and how they're related to the environment, and thinking about, OK, so it is about politics and it is about power, and it is about social justice and it is about how particular people are situated in the world and how, and what that means for them in terms of impacts of climate change." (Lori)

Eco-justice concerns or the rights of other species were generally overlooked in discussions with position-holders. However, as discussed in Chapter 4, a meaningful educational response to climate change requires recognition of the natural environment and examination of human relations with nature (e.g. Haavelsrud, 2013; Kopnina, 2015; Washington et al., 2017). According to Schlosberg (2012), a capabilities lens offers an understanding of justice that recognises the interrelationships of humans and the natural environment and sees justice amongst humans as being dependent upon the functionings of the natural world. Hence, a climate change education informed by the capabilities approach could provide scope for broader conceptions of justice to be introduced.

In terms of justice-related content as part of climate change education, various ideas were proffered (see Appendix 16). There was a notable emphasis placed on the need for recognising global and local justice in parallel, for example:

> "Critical and reflective thinking about how the local and the global interconnect, and your responsibility depending on where you are in the world to the rest of the world." (Lori)

The combined perspectives were perceived to be necessary to remove the abstraction of climate change for students, thereby according with perspectives in the environmental education literature, as discussed in Chapter 4. Participants acknowledged various complexities associated with climate change justice in education settings, for instance, that teachers might lack the confidence to discuss

justice (reflecting concerns raised in Subsection 7.3.2.3 above), that justice-related discussions can introduce complexities regarding individuals' values, and difficulties of knowing which age groups to introduce issues of justice to. There was some discussion of climate change education and justice in terms of knowledge attainment (e.g. "there are things you can say that are factual … you can teach them what the relative contributions of different countries are to human-linked emissions over time" [Hugh]) in a way that accorded somewhat with *Climate Change Education for Knowledge*; however, as I will go on to explain, many participants descriptions of climate change education could be understood in terms of capabilities. That is to say, a climate change education with concern for justice at its core would enable students to make choices about what they might 'be' and 'do' relative to climate change.

7.4.2 A more expansive purpose

The second theme concerns a purpose for climate change education that can be understood relative to capabilities, where the emphasis is on the opportunities that should be enabled because of such education, more so than the knowledge and skills that should be attained. For example:

> "We want more people to have a better STEM education because … more of them will actually have the choices as to what they do." (Ambrosia)

Others emphasised the value of knowledge and skills, because they enable students to understand, deliberate upon, and to live and work in the context of climate change:

> "(to) empower students for their lives ahead, who are actors, citizens. They need to understand these issues, and climate change is one of the most important issues that they're going to face in their life." (Hugh)

Elsewhere, position-holders held that climate change education should "foster different pathways to act on climate change" (Ada), to help students "affect change" (Molly) and "undo the damage that's been done" (Nichola). Where capabilities are 'opportunities' that people have to do or be things they value, these perspectives point to a purpose for climate change education oriented around maximising student opportunities to obtain a range of knowledge, skills and other potential outcomes that would enable them to choose what they do or become relative to climate

change, thereby affording them with the "best possible chance" of responding to the crisis (Alannah).

7.4.3 Enabling capabilities

The third theme relates to capabilities that climate change education could or should enable. I acknowledge the extensive discussions in the literature concerning lists of capabilities, including Kronlid and Lotz-Sisitka (2014) discussion on climate change education and adaptation that explores *learning* as one of a list of four capabilities in the context of climate change adaptation. This section does not propose a list of capabilities *per se*, but rather, it explores various outcomes of climate change education that extend beyond knowledge acquisition that a capabilities framing helps to make sense of.

Position holders described that climate change education should develop students' present-day and future capabilities, for instance, so that they can lower emissions and take political action (Ada), "make choices" and "make a difference" (Alistair). In addition, were other noteworthy outcomes that I will now briefly discuss.

First, was an emphasis that ten participants placed on the importance of climate change education for developing students' capacity to evaluate and debate evidence relating to climate change. This was most commonly discussed relative to science skills:

> "… the ability to bring scientific understandings to bear on understanding phenomena around them, and to engage in an informed way in public debate in issues that are relevant to individuals and to society as a whole." (Ellen)

Some emphasised the importance of critical thinking capabilities to enable students to question knowledge: Josephine described this as "sort(ing) out the truth from not the truth", or as Xavier remarked, while students "can't be expected to crack climate change" they can be "taught to constantly question beyond the science." Regarding critical thinking, four participants emphasised the importance of developing students' epistemological knowledge through climate change education. Being able to understand and question their own knowledge - to examine their "knowledge about knowledge" (Molly) – was perceived to be helpful for students to distinguish between justified beliefs and opinions, thereby supporting their ability to make

choices pertaining to climate change. Thus, these perspectives point to outcomes of climate change education that extend beyond knowledge attainment could be understood in terms of opportunities that would enable students to 'do' things that they choose.

The second outcome pertained to an emphasis that was placed upon 'empathy', that is, four participants asserted that climate change education should support students in developing a capability for empathy. They recognised the importance of helping students understand that climate change is being experienced differently for different people around the world, for example, to:

> "find the parallels between what could potentially happen in the UK and what is already happening in other places [and to develop] *empathy* for why is it that the world is in the state it's in and it's not just about us doing a bit of recycling, so that poor people don't have to drown." (Lori, emphasis added)

Whilst knowledge relating to climate change was recognised as an important contribution to the development of empathy, its acquisition was not the goal. Ada, for example, held that climate change education (indeed, all education) should nurture capabilities for empathy and compassion, as follows:

> "Education should get people to have empathy with other human beings and learn about their role as, like, a global citizen and even as a citizen of their country, caring about those in poverty, or caring about those who will be affected [by climate change]. I think, more broadly, education should teach us to not be selfish, I guess. And climate change, in a lot of cases, is a problem of selfishness." (Ada)

Regarding the third outcome, six participants emphasised the links between climate change education and capabilities for employment. In so doing, these perspectives mirrored the orientation of education identified in the policy analysis. Participants discussed how students would need capabilities for climate change-related employment (most commonly framed relative to science and STEM jobs) and/or for employment in a context of climate change. This capability for employment was associated with particular skills: problem solving and critical thinking skills, scientific and multi-disciplinary knowledge, and "soft skills" (Ewan), such as networking, influencing and collaborative skills. Indeed, according to Jon, in

the context of climate change, employees would need to "become more scientific in every aspect" and be able "to question, to create, to innovate, to work collectively." Beyond the development of particular skills, several participants also contended that climate change education should foster 'opportunities' to enter higher education and move into climate change-related science or STEM careers, whilst also exposing all students to diverse (albeit unspecified) climate change-related employment options. Thus, for several participants, education was positioned as serving a broad employment purpose in the context of climate change. As Ewan commented, it should:

> "equip people with the skills needed to solve [very] big problems and complicated problems … [to] improve yourself and get yourself out of poverty and limiting situations … [and] to improve your employability opportunities and therefore, progress your career." (Ewan)

Comments such as this, resonating with the emphasis of the policy landscape on skills, employment, and participation in the economy, are indicative of an instrumentalisation of education. Notably, several participants were highly critical of orienting the purpose of education towards employment as being an outdated "narrow, instrumentalist view" (Lawrence) that did not meet the needs of the current or future workforce (Richard), nor learners' present needs as citizens (Alannah). Nevertheless, this extract, alongside the fore-mentioned capabilities, illustrates a conceptualisation of climate change education that reaches beyond simply learning <u>about</u> climate change, to one with the intent of enabling students to develop capabilities so they can make choices about what they 'do' or 'be'.

7.4.4 Developing and acknowledging student agency

The fourth theme contributing to *Climate Change Education for Capabilities* concerns the role of education in developing student agency. Saito examines education's role in expanding student capabilities in terms of both present-day capabilities (or abilities) as well as future freedoms, that is, in terms of capabilities that will support students in their adult lives. On the basis that the long-term consequences of climate change are going to be dealt with by today's children rather than today's adults, position-holders tended to discuss the importance of developing student agency as preparation for adulthood, for instance:

> "build(ing) up young people, so they can become active players in their future lives." (Josephine)

Others emphasised that the role of education was to equip them for future action:

> "The fact is that you're equipping them with the truth, and you're equipping them to play a positive role in tackling what's before them." (Hugh)

Or as follows:

> "So, if you get them, get them early now, they can turn around the way countries operate, and they can make a difference… So, that's what's important. I mean, it's not important on its own for reducing emissions, that will mix things up, it's about building that support network underneath." (Alistair)

In addition, some position-holders recognised that climate change education could support student capabilities in the present. That is, that it should help them in understanding where they can influence and on what issues (Jon), where they have power to act now and in the future (e.g. through diet, travel, investments and pensions [Alistair]), and to develop "agency to have a voice in the debate" (Ambrosia). Josephine remarked that, while teachers often want learning outcomes (in line with the curriculum and assessment regimes, and more closely tied to *Climate Change Education for Knowledge*), students often want skills and confidence to enable them to negotiate for change in the present:

> "…you can enable young people to feel empowered, have a sense of agency, feel they've got skills, build their resilience, understand how change happens." (Josephine)

Hence, these perspectives point to a role for education in the context of climate change that concerns students' agency. Whilst the emphasis was more commonly placed on capabilities to enable future freedoms, some attention was paid to student agency in the present, thereby according with Saito's (2003) view. Based on the agency demonstrated as part of the recent student activism (discussed in Chapter 3), there would appear to be scope for further exploration in this area.

7.4.5 Reflecting on Climate Change Education for Capabilities

This section demonstrates that the capabilities approach provides a useful theoretical lens for viewing a range of perspectives relating to climate change education. First, it has the potential to provide a justice-based theory on which climate change education could be further conceptualised. Second, it supports articulation of a purpose for climate change education that extends beyond knowledge attainment. Third, it enables the outcomes of climate change education to be understood as broader than knowledge, for instance, in terms of capabilities that could enable students to respond to climate change, including through employment or empathy. Fourth, it supports an understanding of the role of education in terms of a student's whole life, rather than being merely a pathway to the next step of education. Hence, a capabilities lens helps to shift the orientation of climate change education from what students should know, to developing a range of student capabilities that could enable them to make choices in their lives. In so doing, it introduces rich and complex discussions relating to values (another fertile area of discussion in environmental education [e.g. Ünal et al., 2018]) in terms of developing people's judgement about exercising those capabilities (Saito, 2003). As Kronlid and Lotz-Sisitka (2014) have noted, and this discussion has shown, there is scope for further development of the links between the capabilities approach and climate change education. For now, what is important is that *Climate Change Education for Capabilities* builds upon *Climate Change Education for Knowledge* by valuing knowledge and skills, whilst supporting envisaging of what more it could be.

7.5 Expansive Climate Change Education

The third and outermost conceptualisation – *Expansive Climate Change Education* – reflects calls in the literature concerning the need to rethink education in view of the climate crisis. In Jickling's terms (2016), this conceptualisation reflects a collective pull towards something more radical. Just as *Climate Change Education for Capabilities* adds to *Climate Change Education for Knowledge*, this third conceptualisation offers a further extension. It reflects a broader role and conception of education than that which was described relative to the inner nests, and one that explicitly positions education as part of society's efforts to respond to

the climate crisis. In so doing, *Expansive Climate Change Education* encourages thinking through what education could be in a way that chimes with Lotz-Sisitka's provocation:

> "Can we break education, and think about it not as in terms of the inside of teachers and institutions but from the perspectives of 'out there'?" (personal communication, 4 September 2019).

Notably, *Expansive Climate Change Education* reflects the perspectives of fewer participants than the inner two nests (11 participants), which can potentially be understood in a Foucauldian sense. That is, amongst these views lie challenges to the "socially visible, acceptable definitions" (Scheurich, 1994, p. 306) of climate change education, the dominant models of education and the tendencies evident in the policy analysis. Illuminating these perspectives is an important contribution of this research. This section explains *Expansive Climate Change Education* through a discussion of four themes that were identified in the analysis.

7.5.1 Education is linked to the climate crisis

At the heart of *Expansive Climate Change Education* lies a recognition of the climate crisis and concerns about the connections between education and climate change causes, mitigation and adaptation. Several participants contended that society's failure so far to mitigate the risks of climate change, means that social structures and institutions, including education, need to be rethought. Indeed, concerns were raised about the bearing that the current education system has upon individuals, society and the planet. As Xavier stated pithily:

> "You've got to question a system that produces well-meaning people [destroying] the world." (Xavier)

Lawrence associated concerns about the links between education and climate change to dominant knowledge and knowledge processes within education. Criticising the emphasis on existing knowledge for present day and future needs, he argued that the dominant "systematic" and "linear" approaches to education have been complicit in the crisis:

> "What is the cause of our knowledge that leads into that linear process? We're basing our needs on what we knew yesterday, and possibly today, on that trajectory." (Lawrence)

He went on to advocate for de-emphasising disciplinary and linear knowledge processes and for acknowledging and embracing the 'unknown' as an attribute of the future, whilst acknowledging the difficulty of doing so:

> "These are big questions that I have no answer to. We're moving into now what is being called by some people as the unknown unknowns… [and later] … the unknown unknowns that are really at the heart of our dilemma." (Lawrence)

Resonant with Selby and Kagawa's (2010) proposal for education for sustainable contraction and Kopnina's (2020) education for alternative economic models (e.g. degrowth), Lawrence argued that climate change education needed to accommodate more open-ended views of the future that were unshackled from economic growth. As noted previously, dealing with poorly defined concepts, let alone 'unknowns' is difficult in policymaking contexts and is a matter I return to in the Discussion (Chapter 9). What is important here is that views coalescing in *Expansive Climate Change Education* take into account that there is a climate crisis, that major changes are needed to ameliorate it, and that (school) education has a role to play in society's response.

7.5.2 Change as a 'social driver'

The second theme concerns the centrality of the notion of *change* as part of climate change education. It relates to calls for an open-endedness in education, and to embracing 'unknowns', and stems from a recognition by at least eight participants that climate change is occurring alongside and interconnected with myriad societal issues that education needs to prepare students for. Chris' perspective was particularly insightful in this regard: he argued that in this context *change*, rather than climate change, should be of central concern for education. Chris described that climate change would make the natural environment more extreme and less predictable, and exacerbate challenges associated with changes in employment and economy. He foresaw a rapidly changing future world "at a social level, in our cities, and in our landscape" and that society needed to be "fleet of foot" to survive and flourish amidst those changes, with "skills and attributes of … creativity,

adaptability, resilience". Thus, rather than the "learning-led, information-led approach to education [that] is really poor", when discussing a role for education as part of this future world, he argued for education outcomes resembling capabilities as discussed above, and for a more clearly articulated and immediate "social driver." He contended that this driver was 'change':

> "If the society recognises they need to address that challenge [of rapid change] and they recognise climate change is exacerbating that, then that for me might be the starting point for where you can start to address some of this issue." (Chris)

Thus, an *Expansive Climate Change Education* oriented around change, could help to untether such education from learning about climate change and more readily incorporate the unknown. Furthermore, placing *change* as the chief concern could support the development of the individual capabilities described above, whilst also accommodating views of education where the purpose is construed at a societal, rather than individual, level. I discuss this reorientation in the following section.

7.5.3 Schools responding to climate change

Alongside recognition of the climate crisis, and discussion of this alongside myriad other changes, *Expansive Climate Change Education* also incorporates perspectives that reflect on the role of education as part of society's climate change response. Three participants explicitly discussed climate change education oriented towards social participation, to develop "social responsibility" (Faith) or to foster societal rather than individual benefits, for instance:

> "… to develop the cognitive ability to explore what *our* future needs to become more sustainable." (Lawrence, emphasis added)

Five participants reflected on the social and environmental impacts of climate change that would have a bearing upon social structures and institutions, such as education, and would therefore, require adaptation. For example:

> "Schools are going to be subject to these risks as much as anything else and children are going to be directly affected… Schools are going to have to deal with the consequences. They have to equip people and they have to make plans themselves." (Hugh)

With prompting, participants proposed a range of topics relating to climate change education and adaptation (detailed in Appendix 16). Moreover, alongside these topics, several participants emphasised the important roles that schools would play in communities in the event of climate change-related impacts being experienced in England. That is, in the event of flooding, schools and the dominant approaches to education (that rely heavily on knowledge attainment) will be impacted upon. Students and teachers travel to school would be interrupted, exams/tests delayed and parents' ability to provide care and learning support would be compromised amidst their own challenges. The relevance of these concerns has become increasingly clear as England has had to respond to the coronavirus pandemic. They point to the need for thinking about education in the context of what Kagawa (2013) refers to as the 'creeping emergency' of climate change in ways that can enable "continuity of education process" (Lawrence). They also highlight the need for system-level planning for adaptation that includes the role of schools. As Hugh remarked:

> "Schools are essential. If you lose a school, it can kill a community." (Hugh)

Thus, schools were described as "social infrastructure" (Faith) with both "practical and symbolic" (Lawrence) value in the context of climate change.

Whilst there was some discussion amongst participants linking schools to climate change adaptation (as outlined so far), the majority did not include it in their concerns (indeed, some were dismissive, for instance "school buildings have never been the right temperature for comfortable learning" [Jon]). In the absence of prompting, there was little evidence that most participants had given any thought to climate change education and adaptation. This accords with the policy landscape, where education and adaptation is largely overlooked, apart from references to overheating and shade in two *Building Bulletins* (DfE & EFA, 2014; ESFA, 2018). Such a low profile of climate change adaptation as a concern for education also reflects the assessment of the Committee on Climate Change that the UK government has paid scant attention to adaptation. Moreover, echoing the Committee's remarks, "Government cannot hide from these risks" (2019, p. 8).

7.5.4 Broader spaces and enactments of learning

The final theme identified in the analysis that accords with an *Expansive Climate Change Education* concerns locating school education within a broader

conception of education. Lawrence contended that education in the context of climate change should be:

> "… exploratory and emancipatory, an exploratory process, that takes us into a post-growth scenario that says: how do we now learn about what it means to be more sustainable?" (Lawrence)

Accordingly, he described a need to situate school education as part of a broader educational response to climate change, as follows:

> "We need this to be a social learning process that doesn't just start in schools. It can't just be laid at the door of teachers, that they are responsible for it … but it's part of the process of responsibility, the teaching process, to embrace that." (Lawrence)

Whilst the integration of formal and in-formal education in science education was reported (Alannah and Richard), there were no similar reports of ties relating to climate change education. Given the lack of related policy intention, along with the overall lack of policy attention to climate change education, a want of integration would be unsurprising. In several ways, the perspectives captured here resonate with discussions on social learning (Wals, 2007) in how they acknowledge the range of interrelated contexts and ways that climate change learning occurs, thus pointing to the need for more open-ended and integrated conceptualisations regarding its education. The following discussion focuses on two aspects of this broadened view of climate change education, that is, spaces and enactments of education.

7.5.4.1 Spaces of education

First, to 'spaces of education', an area of research that Facer (2014) suggests has been under-examined as schools and classroom teaching have dominated the educational landscape, but that now is being paid increasing attention, because of the disruption triggered by digital technologies. It could be reasonably asserted that the disruption arising from the coronavirus pandemic has also been bringing consideration of 'spaces of education' into focus. Thus, perspectives falling into *Expansive Climate Change Education* point to the productive potential of thinking about climate change education unfettered by the school gate. As discussed already, discipline-based education has been criticised for being too narrowly conceived to

accommodate the types of learning required for climate change and that its education needs to go beyond traditional classroom, school and university approaches. While five participants specifically advocated climate change education as a whole-school approach supporting students in translating its related knowledge into action in ways that curriculum does not (for instance, by engaging with senior management and estates [Sylvana]), others went further. When conceptualising climate change education in practice, attention was drawn to the importance of learning beyond the formal curriculum or classroom. That is, climate change learning was described as occurring amongst family and friends (Lori), in language and faith groups (linked to and in addition to the role of faith institutions in formal education), in community and youth groups (Lori and Alistair), in community gardens, online (Lori, Ewan) and in what Lori described as the "places in between":

> "…where the really interesting stuff happens. And where people take their learning in school and apply it somewhere." (Lori)

Such views envisage climate change education framed by community learning in a way that reaches beyond curriculum-based learning, student-oriented benefits, and schools. In so doing, they could be construed as challenging the boundaries that regulate what education is and how it can be conceived. Drawing on Facer (2014), a climate change education that embraces such views amounts to political rearrangements of space that could reconfigure relationships between education and society, thereby presenting challenges to the status quo.

7.5.4.2 Enactments of education

Alongside these spaces, the analysis led to the identification of three enactments of education beyond the dominant disciplinary approaches: learning in the outdoors, engagement and activism. Whilst these ideas are not necessarily new, they prompt thinking about the place of alternative enactments within a more expansive conceptualisation of climate change education.

Learning in the outdoors

The first of these enactments was learning in the outdoors. Several participants promoted school-based outdoor learning (including fieldwork [Rex, Molly] and vegetable gardening [Theo, Lawrence]) as important for climate change

education, because it provides opportunities to: observe and understand change in the natural environment; increase the curriculum's relevance (inclusive of climate change content); improve student learning outcomes and mental health; and develop valuable skills for adapting to climate change. Several of these views were somewhat aligned with *Climate Change Education for Knowledge* and education about climate change. They also mirrored the policy analysis by positioning the natural environment relative to human concerns.

Elsewhere, and in accord with an expansive version of climate change education, Chris contended that the outdoors could sit alongside *change* as a driver of an educational response to climate change. He argued that a connection with the natural environment motivated change in ways that reached beyond education about climate change, to education that helps society to respond to it, as follows:

> "If the holy grail here is, if what you want to do is to get people to take action for climate change, then the question is, what is the process of connection? And it's not eco-literacy. Which means that it's not ultimately sitting within the curriculum. It's the experiences that those children will have, maybe through school, maybe at home, that somehow engage them." (Chris)

Hence, his perspective framed learning in the outdoors as being more than learning about the natural environment and developing 'eco-literacy'. What was more important for Chris, was for students to build emotional connections, or to engage with the natural environment in ways that worked across and beyond a curricular approach, which was for the natural environment. Similarly, Ada argued that it was crucial to foster student connections with the natural environment, if education were to lead to pro-environmental actions that are necessary for climate change amelioration.

Engagement

A second enactment discussed was 'engagement'. Whilst Chris and Ada's comments above point to engagement as an outcome of learning in the outdoors, this section considers perspectives describing engagement as an educational process or *enactment*. These perspectives all linked processes of engagement with particular purposes. For instance, public engagement was described as important for raising the profile of climate justice amidst the dominant scientific discourse (Ada);

engagement was described in terms of campaigns, online resources and targeted information to extend government's reach (Alistair); and engagement and communications processes were described as fostering connection with the natural environment (Chris) or to "…get people doing something" (Faith). Whilst acknowledging the theoretical complexity associated with engagement in educational contexts (e.g. Fredricks et al., 2004; Godec et al., 2018), this conceptualisation does not propose engagement as a replacement or a proxy for education. Rather, it suggests that further consideration of how engagement processes beyond schools could be coupled with formal education processes and result in a more integrated, holistic educational response to climate change.

Activism

The third and final enactment identified in the analysis was 'activism'. As discussed previously (Chapter 1, 3 and 5), this research coincided with a period of civil action on climate change. Whilst the position-holders in later interviews reflected on the strikes in the UK, links between climate change education and activism were also discussed in the earlier ones.

For instance, the "fine line" (Alannah, Ambrosia) between education and activism was acknowledged. Reflecting the criticism of sustainability education discussed in Subsection 7.3.3 above, the view was expressed that, "activism done badly" (Callie) had a detrimental impact on learning about climate science. Such views tended to rule out or dismiss activism as an educational possibility. However, others described the strikes as an opportunity to think differently about what climate change education should be. Xavier, for instance, described the strikes as "fertile moments", as "spaces for education" that create geographical and intellectual environments for learning, exchange and fostering politically active citizens:

> "Big sort of spaces for education … both geographically and … creating an intellectual environment where people can learn a lot and be radicalised." (Xavier)

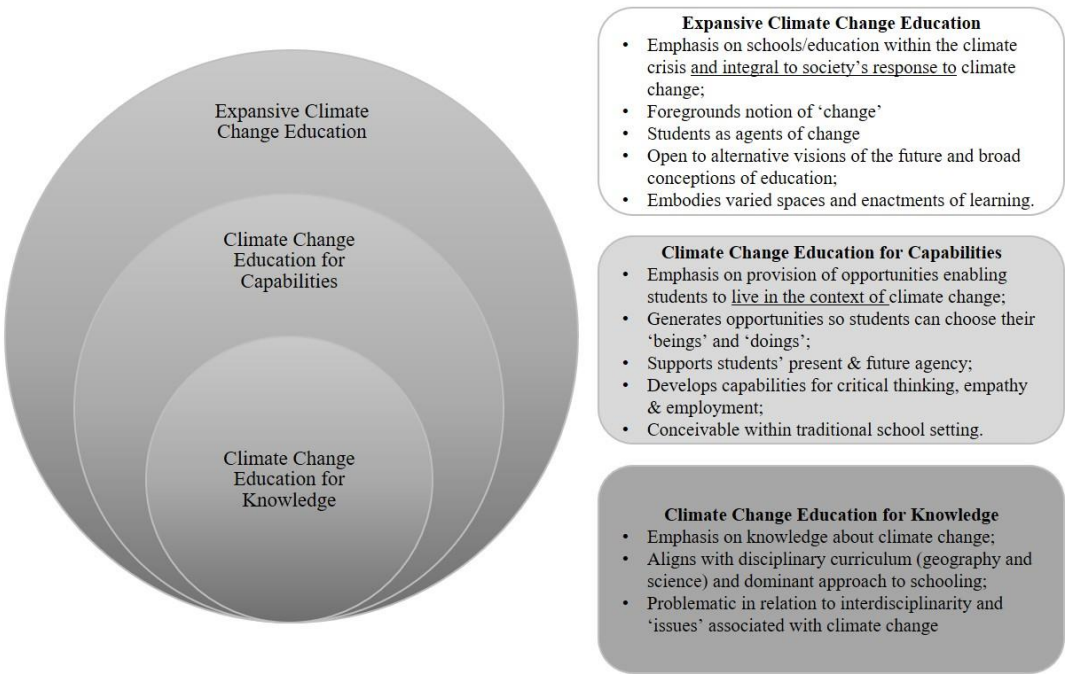
Thus, thinking about strikes as political and educational events is another way to challenge the enactments of education. The Discussion chapter considers activism further.

Recapping briefly, *Expansive Climate Change Education* acknowledges that education has a role to play in response to the crisis, alongside other challenges. Perspectives captured here call for education to be unshackled from dominant approaches and understandings of education if it is to respond meaningfully to climate change. Whilst it incorporates and builds upon both the discipline-based learning of *Climate Change Education for Knowledge*, or education about climate change (Lucas, 1972) and the individual capability development associated with *Climate Change Education for Capabilities*, this conceptualisation opens up to the possibility of planning school education as part of a systemic societal response to climate change and, in so doing, for exploring and connecting spaces and enactments of learning as elements of an expansive and integrated educational approach.

7.6 Summary

To sum up, this chapter has demonstrated that climate change education is not easily definable. The complexity evident amongst perspectives indicates the diverse understandings and contexts that position-holders bring to their conceptions of climate change education. Through the analysis I was able to organise the perspectives into three nested conceptualisations that are connected by permeable boundaries, and that function cumulatively, as summarised in Figure 3 below.

Figure 3: Conceptualisations of climate change education



With further theoretical development of the nested conceptualisations, a framework such as this could support evaluation of current approaches and envisaging alternatives. Further development could also reflect on the correspondences between the views reflected in this heuristic, and other models of environmental or sustainability-related learning, such as Gough and Scott's (2003) three types of approaches for thinking about sustainable development learning and change, Vare and Scott's 'interrelated and complementary' approaches to education for sustainable development (2007), and Öhman's (2004) selective traditions of environmental education.

In concluding the chapter, I reiterate that the complexity and diversity of views amongst position-holders illustrates just how complex it might be to respond to calls for 'more!' climate change education. Moreover, this complexity highlights that instead of focusing too much attention on defining what climate change education is, perhaps it would be more productive to understand better how it is being governed. Accordingly, the final findings chapter examines how influence has played out in climate change education policy in England.

Chapter 8. Influence and England's climate change education policy landscape

8.1 Introduction

This third and final findings chapter examines how influence is being wielded in relation to England's climate change education policy landscape. It provides insight, enabling me, in the Discussion (Chapter 9), to address the second research question:

> RQ2: Who has influenced climate change education in England and how has that influence been wielded?

Overall, the analysis found limited evidence that position-holders and other stakeholders were wielding influence regarding climate change education policy. This lack of attention is arguably justifiable when considered on individual bases, however, a more worrying picture emerges when the situation is viewed as a whole. Not only does climate change education have a low profile in the policy landscape, but there is little to indicate that, under the influence of the position-holders, this situation is likely to change.

As described in Chapter 5, the participant sample was generated to capture a "representative range of perspectives" (Gillard, 2016, p. 29) amongst people in positions of (potential) influence in relation to climate change education policy. That is, as a policy archaeology, the analysis was more interested in 'vocality' than 'authorship' (Gale, 2001); in what was said more so than who was saying it. I did not set out to attribute blame to position-holders; we all operate within the ensemble of power and are navigating the governmentalities of climate change education within our own contexts. Hence, consistent with Chapter 7, the emphasis of this analysis is to develop a deeper understanding of the perspectives that were shared, rather than those held by each position-holder.

The chapter begins, in Section 8.2, by introducing six features that characterise *what* influence looks like regarding climate change education policy. Section 8.3 focuses on the *how* of influence, that is, the techniques that position-holders use to influence climate change education policy or, more accurately, the techniques they use to influence other areas of policy. The final part, Section 8.4, goes on to examine the six key stakeholder sectors that were identified through the

analysis. The exploration of characteristics, techniques and stakeholders as well as the various interactions between them, provides valuable insight into how influence is being wielded in relation to climate change education.

8.2 Features of influence regarding climate change education in the policy landscape

The analysis of participant perspectives identified six salient interrelated features that describe *what* influence looks like regarding climate change education in the policy landscape:

- Low prioritisation of climate change education;
- Neoliberally aligned attributes;
- Messiness within the policy landscape;
- Disconnectedness;
- Deference and restraint;
- Indications of shifts.

The characteristics are introduced hereunder and unpacked throughout the chapter.

First, it was elicited that a low prioritisation of climate change education pervaded. Generally speaking, at the time of the interviews, stakeholders and position-holders whose work related to climate change were not found to be prioritising (school) education. Those engaged in education were not found to be prioritising climate change and nor were those working in sustainability or environmental education. In the words of Richard:

> "[Climate change education] is a squalling baby. You know, everybody knows it matters, but 'Please, can you look after it because I don't want to'." (Richard)

Climate change education practice was perceived as having "dropped down the agenda a bit" (Edmond) and as no longer "fashionable" for schools (Ambrosia), reportedly due to reduced government funding and "political vagaries" (Alona), to the media directing attention elsewhere (e.g. plastics), or to passivity:

> "We hear about climate change broadly in the media, even young children, all the time, and so it's very easy for teachers to think, 'it's not in the curriculum now. But we, you know, sort of, we cover it just in general conversation.' Whereas we're not." (Molly)

According to Ada, such low prioritisation of climate change is exacerbated by a low prioritisation of education:

> "I think education, in general, is, just like, low in people's minds. Like, I think it's not prioritised, it's not funded properly; it's really based on exam outcomes." (Ada)

The second feature concerns the presence of interrelated neoliberally aligned attributes, thus echoing the findings of the policy analysis. These attributes, evident in terms of accountability, performance measurement, wellbeing and individualism, appear to have influenced and indeed, to stifle climate change education related activity.

Third, position-holders and other stakeholders' capacity to influence seem to have been impeded by messiness within the landscape, for instance: that processes and timeframes for academic research are at odds with those of policy influence; that complexity and changeability of government and non-government systems hamper efforts to influence; and that long-term visioning is impeded by the politically contested nature of education and schools.

Fourth, there is an apparent disconnect amongst stakeholders that is coupled with a lack of leadership in relation to climate change education policy influence. In view of the origins of this study being in the environmental education research field, it is noteworthy that the analysis identified that individuals or organisations from the environmental education sector were not recognised as leaders or active influencers by others.

Fifth, approaches to policy influence can be generally characterisable as deferential and/or restrained. Consultation and evidence-gathering processes have lacked a sense of urgency or assertiveness, whilst policy influence relationships have been nurtured with sensitivity towards the long-term, without a focus on climate change. Indeed, most position-holders seemed to distance themselves from climate change education policy influence through deference to their disciplines, organisations or other priorities.

The sixth and final feature concerns indications, albeit limited, of 'shifts' that could influence climate change education. Shifts were discussed in relation to climate change policy, for example:

> "The scientists realise that just giving information on what's going to happen is not enough to actually influence policy. I think they're starting to turn to social scientists and people in the arts and humanities and things, and say, what do you think? How do we actually bridge the gap between 'here's the facts' and 'here's the policy'?" (Ada)

Others suggested that shifts were imminent in the education system: that students are missing important aspects of education and that education should do more than "churn kids out with good GCSEs" (Ewan); that "we are at the end of the pendulum swing" (Richard) of the school inspection system; and there are "voices" (Richard) saying the curriculum has gone far enough. Shifts were also perceived relative to the student strikes and to teachers, with claims that the latter were more aware of climate change impacts (because of the media, learning through social and family networks, and citizen science projects) and were simply "getting on with it" (Molly).

Whilst five of these features paint a somewhat grim picture regarding how influence is being wielded in relation to climate change education policy in England, the sixth offers some hope. They are all explored further throughout this chapter.

8.3 Position-holders' influencing techniques

As indicated already, there was limited evidence of position-holders having influenced, or intending to influence, climate change education policy. That said, their descriptions of *how* they influenced other areas of policy provide valuable insight. Through thematic analysis, I was able to group the techniques they used into five categories: practical tools, evidence, political participation, connectedness and stances. The characteristics introduced in Section 8.2 are evident amongst the techniques. The techniques and corresponding characteristics are summarised in Table 6 and discussed below.

Table 6: Alignment between the influencing techniques used by position-holders and the features of influence in the policy landscape

Influencing techniques	Features of Influence
Practical Tools	Low prioritisation of climate change education (Dis)connectedness
Evidence	Neoliberally aligned attributes Messiness

Political Participation	Low prioritisation of CCE Messiness Deference and restraint	
Connectedness	Low prioritisation of CCE Disconnectedness	
Stances	Standing back Low prioritisation of CCE Deference and Restraint	Stepping up Disconnectedness Deference and Restraint

8.3.1 Practical tools

Position-holders described a range of practical tools they used to generate interest in topics and influence policy, including: meetings and seminars, research, reports and journals. Whilst two references were made to previous policy briefings as part of the 2013 curriculum reform (Hugh, Callie), discussions indicated that position-holders were not currently using the tools they described to influence climate change education policy. Moreover, neither their stakeholders nor any other stimuli (e.g. the recent IPCC report [2018]) had prompted them to do this, and some also claimed that it was not in their organisation's remit to do so (discussed further in Subsection 8.3.5 below). It was also apparent that the effectiveness of the tools was reliant upon the connectedness of the position-holders (discussed in Subsection 8.3.4 below).

8.3.2 Evidence

'Evidence' was reported by seven participants as being an important technique, or tool, for influence and in several cases, a lack of it was cited as a reason for not influencing. In several ways, participants descriptions of evidence-use reflected elements of Rickinson and colleagues (2017) evidence-use framework that emerged from a study of policymakers (i.e. government employees) in policy processes. To explain, the position-holders in my study described evidence use in accordance with "keeping things on the agenda" (Rickinson et al., 2017, p. 181): they described evidence as a necessary part of proving "what works and why" (Jon) and for reinforcing existing intentions or initiatives (Chris). Descriptions also accorded with "getting buy-in from key audiences" and "identifying possible interventions" (Rickinson et al., 2017, p. 181): evidence was used to provide "route maps" (Ambrosia) for policy makers. Lawrence described the importance of

evidence as part of critique - "in the absence of evidence, criticism lacks conviction and can paint an inaccurate picture" – thereby resonating with Rickinson and colleagues' evidence-use practice of "challenging proposals/assumptions" (2017, p. 181). Other perspectives did not readily correlate with Rickinson and colleagues' framework. For instance, three participants highlighted the importance of evidence to overcome perceived bias associated with self-reporting in sustainability or climate change-related initiatives, thereby counteracting a perceived vulnerability in the field. Elsewhere, the importance of evidence was emphasised as accounting for expenditure in a context that "you can't say you failed at anything" (Alona). These latter views point to potential discrepancies in evidence-use practices that might exist amongst different types of position-holders in policymaking processes; that evidence-use practices are related to the position of individuals or organisations within the ensemble of power. They are also indicative of evidence-use as a mechanism for accountability, thus mirroring the drive for accountability in the education system (Gewirtz et al., 2019). That is to say, the use of evidence as proof resonates with "a neoliberal faith in the fact that those key features of the world worth measuring can be objectively evaluated and expressed numerically in this act of accountability" (Hursh et al., 2015, p. 306). These comments thus point to evidence-use to retain a footing more so than to explore possibilities.

8.3.3 Political participation

A third technique, political participation, was identified in relation to national, local and organisational policy influence. Participants highlighted avenues for high-level political participation through select committees (Lawrence), government consultations (such as the 2013 National Curriculum consultation [Hugh, Callie, Rex]), and lobbying local MPs to reach ministers:

> "The only way to make the change is from doing that, having minister's, MPs and others will make the decision, if the public demand it." (Alistair)

Yet, choices to participate in political processes seemed impeded by various factors, alongside a reluctance to participate. For instance, several participants described difficulty associated with participating in political processes owing to the messiness in the system and the government being "adversarial" (Lawrence), siloed, fragmented and fluid (Molly, Richard, Lawrence, Theo) (discussed further in

Subsection 8.4.1 below). Some claimed that participating was "a waste of time" (Josephine) and that "responses got buried" (Callie), echoing Alistair's perception that the public has not been demanding change from their MPs. Others described their limited participation in ways that indicated deference. They described how participation required careful balancing of relationships as well as managing organisations and individuals' reputations (Nichola, Richard, Alannah, Molly, Hugh) using terms such as "softening up the dialogue" (Ellen) and that influence is a "delicate question" (Richard), as follows:

> "What we would be saying is 'you are thinking about climate change. Here are some things that can help you. We think you should be doing the following things, because they would help you'." (Richard)

Whilst judgement and prudence are crucial for relationship management, the overall impression was of position-holders' political participation in relation to climate change education policy as encumbered by a lack of participation, deference, a 'messy' policy landscape and a low priority for such education.

8.3.4 Connectedness

The fourth technique for influencing identified was 'connectedness'. As summarised in Table 7 (below), the analysis revealed various levels of connectedness amongst position-holders' influencing practices, from greater autonomy, through more collaborative responses, to being more reliant upon others.

Table 7: 'Connectedness' as part of climate change education policy influence

Positions of influence	Description	Example
More autonomous		
Self-appointed leaders	Self-nominated 'experts' or leaders who directly intervene in processes	"I have had significant influence within the organisation … the reason we do all of this sustainability education work, is pretty much because I've been there pushing those buttons" (Alona)
More connected		
Conveners, Connectors and Gatekeepers	Power vested in an individual who draws upon personal connections, nominates experts and leaders, and chooses topics, sustains engagement with other powerful people	"I think the ideas come from discussions between the leaders in the field as you see them and the organisation." (Richard)
Contributors	Could be self-nominated, self-employed or undertaking work to participate in processes; limited capacity to choose agendas/leaders	"We're doing it so that we've got ideas ready as and when reforms happen, or as and when we've got the opportunity to put the word in the right person's ear of this is what we think it should look like" (Ellen)
More reliant		
Enabling advisors	Indirect policy influence that relies on others to have influence; work through champions or amplifiers; extends reach when capacity is limited.	"…to create champions and nurture them in other places so they're doing the work for me" (Faith)
Disseminators	Indirect policy influence through public engagement that hopes that something will change by shifting public thinking	"I'm a bit sceptical about trying to influence policy directly and I'm more, actually intuitively, more, like, if I just tell enough people then they'll, I don't know, come up with, like a groundswell of action somehow." (Ada)
Followers	Required as part of policy leadership to agree on ambition and strategy	"But equally well, you've got to bring the schools, the college leadership, the teachers, on board with you into that process. … You

	have to have leadership, but you have to have followers. And there was not a great deal of followership for many of the government policies." (Lawrence)

This summary indicates that connections were important for influencing in a variety of ways. That is, participants adopted a variety of positions from which to influence; positions that had differing aims and relied upon different sorts of connections. Whilst future research could involve exploring the effectiveness of these roles, or combinations thereof, in relation to policy influence, of particular note here is that these perspectives illuminate the crucial role of connections as part of policy influencing.

Of further note is the concept of 'gravitas', which was reflected in discussions with five position-holders and referred to directly by Alannah. Gravitas, associated with an organisation's financial resources alongside intangible qualities, such as history, authority and "convening power" (Richard, Alannah), enabled connections and enhanced the ability of organisations to influence. That is, organisations (and individuals) that were connected *and* had gravitas seemed able to choose topics or areas to influence and to act on those choices. That said, as discussed in Section 8.4 below, there was no evidence that stakeholders with gravitas were using it to influence climate change education policy. Moreover, it was found that stakeholders indicating stronger inclinations to influence climate change education policy, such as the environmental education sector and students, lacked the 'gravitas' to do so.

8.3.5 Stances

The final technique identified was the 'stances' that position-holders adopted. A range of stances was identified (see Table 8 below), characterised as 'standing back' or 'stepping up' to policy influence. There were four 'standing back' stances, labelled as defensive, deflective, passive and novice stances. There were three 'stepping up' stances, labelled as intervening, cooperative and offensive. To provide a sense of the overall sample, the views of 20 position-holders are considered to reflect 'standing back' stances, whilst those of five others are attuned to 'stepping up'. Reiterating earlier comments, the stances reflect an analysis of participant comments not a categorisation of the individuals, which explains why the total number of views is greater than the sample size of 24 participants.

Table 8: Stances adopted by position-holders

Stance	Description	Examples
Standing back		
Defensive	Influencing climate change education policy is not considered to be the role of the position-holders organisation	• Choose not to influence because "it's not our job" (Ambrosia) or our "focus" (Edmond, Rex, Callie) • Focused on the discipline or issues/topics other than CC • Inappropriate for their organisation; not lobbyists or campaigners
Deflective	The position-holder perceived others as responsible for influencing climate change education policy.	• Believe that others are addressing the issue or are better placed to do so • Stakeholders (teachers) aren't requesting it • Encourage others to do the influencing
Passive	The position-holder would engage in climate change education policy influence if invited or approached.	• Waiting for an invitation to contribute • Open to being influenced • Could influence, but in deference to others' advice
Novice	The position-holder perceived they lack the necessary knowledge, skills or capability to influence climate change education policy	• Do not know who to talk to/who experts are • Do not know whose role it is • Do not know what to do • Perception of a lack of necessary experience
Stepping up		
Intervening	The position holder intervenes at perceived crisis points, demonstrates the capability and capacity to do so, then stands back.	• Stay informed, connected and respond through media and consultations during perceived crises, e.g. curriculum reform
Cooperative	The position-holder seeks to influence from within organisations or policy systems	• Get to know the inner workings of government and their place in it • Initiate or participate in collaborative advocacy and networks
Offensive	The position-holder is ambitious and assertive in campaigns directed to high-levels (policy, people, organisations)	• "We need to shout out a lot more loudly" (Sylvana) • Campaign to change the Education Act and create a "social movement" (Josephine)

Illuminating these stances provides several insights into climate change education policy influence. First, the analysis reveals that a range of stances are adopted in relation to this influence. Second, it indicates a strong tendency towards 'standing back' from climate change education policy influence, which in many cases was described in terms reflecting deference to others, restraint or passivity. While the 'stepping up' stances indicated some efforts were or had been made, the influence of these stances seemed hindered by a lack of connectedness amongst those position-holders, deference and messiness of the policy landscape. Third, it emerged that that individual choice plays a part in position-holders' claims about whether they should or should not step up such that, viewed through a Foucauldian lens, these stances could be indicative of 'self-governing' and the role that individuals' governmentalities play in climate change education policy influence. The Discussion (Chapter 9) explores these 'governmentalities' as part of the broader climate change education policy landscape and whether more policy influence might be realisable by supporting position-holders in moving from 'standing back' to 'stepping up' stances.

Summing up briefly, this section has described the five techniques of influence that were identified amongst position-holders' perspectives. The techniques intersect and interact in various ways to effect policy influence: political participation is deferred until there is enough evidence; position-holders with access to practical tools, gravitas and connections, tended to be 'standing back' from climate change education policy influence; and participants who were 'stepping up' were identified as lacking connectedness and evidence. The overall effect is that techniques of influence are being used in a way that is resulting in very little influence being wielded in relation to climate change education. Articulating these factors provides possible explanations for why climate change education is in the state it is and in so doing, opens up potential future avenues regarding how progress could be made.

8.4 Key stakeholders in climate change education policy influence

This section turns to the stakeholders in climate change education policy influence. Drawing from Powell and colleagues' definition of stakeholders as "groups that hold positions or capabilities to transform the situation at stake" (2017,

p. 9), analysis of position-holders direct and indirect references identified six prominent stakeholder categories in relation to climate change education influence, as summarised in Table 9 and discussed thereafter.

Table 9: Categories of stakeholders that influence climate change education policy

Stakeholder category	Description
Government	National government departments and agencies, e.g. BEIS, DfE, Ofsted
Disciplines	Learned societies and subject associations, e.g. Association of Science Educators, the Royal Society, the Royal Geographical Society
Funders	Funders of education research and practice, e.g. Wellcome, Nuffield, ESRC
Universities	Research, teaching and initial teacher education (ITE)
Environmental education organisations	NGOs and charities, e.g. UK Stakeholders for Sustainable Development (UKSSD), Sustainability and Environmental Education (SEEd), Wildlife Trusts
Schools	Head teachers, teachers, students

8.4.1 Government stakeholders not engaging in climate change education

The first influential stakeholder category is government, construed in terms of national government policy, departments and agencies. The Department for Business, Energy and Industrial Strategy (BEIS), the Department for Education (DfE) and the Office for Standards in Education (Ofsted) were identified as relevant to education and climate change, thus they are the focus of this discussion. Notably, the Department for Environment, Food and Rural Affairs (DEFRA) and Natural England received limited attention (each recognised by a single participant), despite their involvement in relevant areas of environment and climate change policy (e.g. DEFRA's leadership of the *National Adaptation Programme* [2018b], and *A Green Future: Our 25-Year Plan for the Environment* [2018a]).

8.4.1.1 BEIS: climate change leadership and limited education engagement

As highlighted in the policy review, BEIS' climate change authority concerns national leadership on the *United Nations Framework Convention on Climate Change* (UNFCCC) and *Paris Agreement*, and the associated *Action for Climate Empowerment* (ACE) (encompassing Article 6 of the UNFCCC and Article 12 of the Paris Agreement), as well as the *Climate Change Act* and the *Clean Growth Strategy*, that is, "the UK's plan for emissions reduction" (Committee on Climate Change, 2017, p. 8). Despite this significant climate change-related authority, a position-holder from the department characterised climate change as not a major focus: "climate change, low carbon, clean growth is one small part" (Alistair). ACE was positioned as a minor constituent of this, described as the "other stuff" that negotiators at the international climate negotiations (the annual Conference of the Parties [COP]) talk about after the discussions of "big tangible things" (that is, emissions and finances). The low prioritisation of climate change education was evident in his description of the UK's minimalist approach to ACE:

> "We try and draw together a strategy from our existing stuff and try and give the agenda a push by highlighting some of the stuff that we're doing." (Alistair)

Whilst Alistair acknowledged schools were ACE stakeholders, he described the emphasis of BEIS' ACE work as being to encourage the public to care about climate change, rather than to play a prominent role in education, by working with various stakeholders "to generate support for UK policy, to promote their work." Thus, mirroring the findings of the policy analysis, a lack of connectedness between BEIS' and school-education (or other education) in relation to climate change was evident. There was also no evidence of strategic or programmatic connections between BEIS and DfE regarding climate change education. Indeed, Alistair commented that "we've got no real say in [the curriculum]" and in a somewhat deferential manner, described BEIS as not 'interfering' with the DfE:

> "I mean, obviously the Department for Education here has got its own curriculum and they do their own thing. I think you probably would've seen that climate's been in and out a bit. We don't interfere with that. I think they have a lot of different sort of pressures." (Alistair)

Multiple position-holders (n = 8) identified BEIS as a climate change education stakeholder, yet, when asked, they were unable to cite specific contacts within the department and none mentioned ACE (whereas there were several mentions of the *Industrial Strategy*). BEIS' low prioritisation of education was rationalised in terms of the siloed nature of government departments. The absence of ACE in discussions of influential policies or strategies is concerning, yet unsurprising, given the limited emphasis that BEIS places on ACE, its apparent lack of engagement with the DfE, and the evident disconnect between BEIS and the position-holders.

8.4.1.2 DfE: education leadership without climate change engagement

Turning to education, the DfE was perceived to be central to England's educational response to climate change and yet, mirroring the policy review, there was no evidence of the department playing an active role or advocating for more climate change education, or encouraging other stakeholders to do so. The disconnectedness of the climate change education policy landscape identified in the policy analysis was again mirrored here, whereby few connections between the department and position-holders were apparent. Participants were unaware who to contact in the DfE in relation to climate change education, as can be seen in the following:

> "I think the DfE would be definitely one to chat to. But getting to the right folk is the tricky bit." (Chris)

Despite multiple approaches, requests made to the DfE to participate in this research were declined and requests for a contact relating to the research topic went unfulfilled.

Several possible explanations for the departments' lack of engagement in climate change education were elicited. First, several position-holders rationalised the DfE's low prioritisation on the basis that the department was dealing with competing issues. Perspectives from five participants indicated that mental health and well-being were more central concerns to education than climate change, such that environment and climate change organisations should target health and wellbeing budgets (Nichola), and that programmes fostering connection with the outdoors should be oriented towards "improving and supporting children's health and wellbeing" (Chris), rather than climate change. The mental health and well-

being benefits of outdoor learning and connecting with nature are not in question here and given the orientation of the policy landscape towards health and wellbeing, nor is the business logic of targeting health and well-being budgets. However, when coupled with the human-centric positioning of the natural environment identified in the policy analysis (Chapter 6), and the anthropocentric benefits that position-holders attributed to 'learning in the outdoors' (Chapter 7), the echoing of health and wellbeing concerns here reflects further concordance with neoliberal values.

A second explanation for the DfE's lack of engagement in climate change education, and one in the department's defence, might relate to the limited evidence that position-holders were seeking to influence policy. That is, as shown above, many were consciously 'standing back' from influence, indicating deference and/or restraint. For example, four participants rationalised their lack of influencing based on the perception that, following the curriculum changes that arose from the 2013 curriculum review, teachers and educators would resist further change. Others perceived the curriculum to be ring-fenced and that lobbying would be fruitless:

> "The school curriculum is a secret garden that no-one is allowed to have a say about." (Richard)

Whilst others, such as Callie, perceived engagement with teachers on the curriculum would be "counter-productive" to their objectives:

> "C: Teachers in this country really don't like interference from the Department for Education. So, if we did have any engagement, direct engagement with them, it wouldn't necessarily improve our relationships with teachers."
> K: And you don't seek it out?
> C: No. No. I mean, why would we want to do that?" (C= Callie, K = Kate)

Such remarks suggest that the disconnect between the DfE and position-holders might run both ways.

A third explanation for the DfE's apparent lack of engagement in climate change education related to broader concerns of policy influence and implementation. First, it pertained to changes in the policy landscape. For example, Theo claimed that academics avoided the DfE (and government generally) because of frequent changes:

> "The last group they [academics] want to interact with is the DfE. And that's not because the people in the DfE are horrible or anything like that. Far from it. It's just a very difficult organisation to work with because the fluidity of change … you cannot operate when something is oscillating as much as that … you can't engage with it." (Theo)

Changes in administrations were also highlighted as problematic whereby they led to policy change and forced rapid programme implementation (Chris), as well as changes in the interpretations of policies or laws, such as the *Climate Change Act 2008* (Faith). Furthermore, participants highlighted that policy implementation can differ from policy intention (Faith, Josephine, Theo) such that, even where policy change might result from influencing efforts, there is no guarantee that the changed policies will lead to intended practices; as research has found, policy enactment differs greatly in context (Maguire et al., 2015). These views, which highlight some of the messiness that exists in the policy landscape, reveal that policy is a problematic tool for generating social change. In so doing, they give pause for thought regarding how much effort position-holders should invest in policy influencing.

A final possible explanation for the lack of engagement by/with the DfE is tied to the curriculum. This was found to be the principal policy lever that position-holders described in relation to climate change education policy influence. As Josephine remarked:

> "There's a massive belief in this country that all you've got to do is change the curriculum. The National Curriculum." (Josephine)

Thus, the focus on the curriculum amongst position-holders echoes the attention that is paid to climate change in the reviewed policy texts. That is to say, as highlighted previously (Chapter 6), the curriculum was the only reviewed policy from the education family that addresses climate change in any substantive way. Although school education has a very low profile in the national climate change and environment policy family, when school education is discussed in relation to climate change education (e.g. *Doha Work Programme*), curricular approaches are prominent. Yet, despite the prominence of the curriculum amongst discussions of policy influence, participants recognised that the time it takes to change curriculum,

and for any changes to manifest in society as an outcome of curriculum change, are out of step with the urgency of climate change. Indeed, as Chris remarked:

> "How do you design a curriculum to cope when five years can be a long time?" (Chris)

Furthermore, Theo was pragmatic about the influence of policies more generally, and that judgement was needed to decide which policies to influence:

> "That's why certain policies when they're enacted don't have an impact. Well, they were never going to have an impact, because they were the wrong things to target." (Theo)

Comments such as these raise questions about the suitability of the curriculum as a target for policy influence, particularly if doing so draws attention away from influencing other policies that might also affect the problem being tackled. For instance, other policy levers that might be available for influence, such as the *Education Inspection Framework*, were largely overlooked by position-holders.

Mirroring the findings of the policy analysis, this section has highlighted the low prioritisation of climate change education relative to other priorities for the DfE and BEIS, and that this low prioritisation is being held in place by disconnects and various problematics associated with policy and policy influence.

8.4.2 Geography and science disciplines: "protecting their turf"

Previous chapters' descriptions of disciplinary approaches, principally geography and science, as the most common frames for climate change education were also evident in the analysis of influence. That is, discipline-based organisations (such as subject associations and learned societies) were identified as authoritative regarding climate change education. Notably, the analysis found that, where climate change education is concerned, this authority tended to be exercised in relation to their disciplines, rather than climate change education. This section describes tendencies that were identified in the analysis of influence regarding the disciplines of geography and science.

8.4.2.1 Geography

Perspectives from position-holders who were closely aligned with geography (by training or by current professional affiliations) indicate that there was an intra-disciplinary geography network[12], whose members had been influential (previously and ongoing) with the DfE and exam boards. Rex, for example, described policy influencing as "a small but very focused part of our work" and that his organisation's influence had contributed to the return of field work in Geography GCSE and A-Level exams. As mentioned previously, participants aligned with geography expressed satisfaction with the curriculum's coverage of climate change, and whilst there were references to early thinking about curriculum change, position-holders evidently were not anticipating or agitating for change, for example:

> "We try to influence the curriculum as it changes, but once we have a curriculum, we just work with it." (Callie)

Instead, emphasis was placed on supporting the current curriculum and exam specifications in a manner that was somewhat deferential to the discipline of geography: developing "better geography teachers" (Edmond); emphasising geographical knowledge, skills and understanding, over issues such as climate change; prioritising "subject identity" over "topic work" (Edmond); and supporting geographic literacy in the wider public.

8.4.2.2 Science

Mirroring the dominance of a science discourse within climate change and education policy, 'science' was identified as a prominent stakeholder category. Several factors contributing to this dominance appeared to relate to the 'connectedness' of science and 'gravitas', as discussed in Subsection 8.3.4 above: historical connections and prestige of the field; supporting mechanisms in government, for example, a direct reporting line from the Chief Scientific Advisor and the Council of Science and Technology to the Prime Minister; the influence of discipline-based organisations[13] and their academic members within government and

[12] Including the Royal Geographical Society, Geographical Association, Royal Meteorological Society and the Geological Society.
[13] For example, The Royal Society, the Institute of Physics, Royal Biology Society, Royal Chemistry Society, Association for Science Education, Earth Science Teaching Association, the Geological

universities; and the mutually reinforcing nature of science research and university lobbies, as follows:

> "The whole science lobby for science research is so strong, and there's another structure that's going on, it's the university lobby, effectively, shorthand. 'Cos that's where most money in universities comes from, science research. So, that infrastructure is there already and some of what we do piggy-backs on the back of that for education." (Alannah)

The analysis points to a well-established network with science, education and influencing expertise and a "strong and unified voice" (Alannah), at least on the surface. Participants described how this influence, coupled with the esteem for scientists and engineers in the workforce, permeated the education system: discipline-based teacher education recruited science graduates; universities influenced discipline-based organisations and schools to ensure that students finished school with high levels of disciplinary knowledge; and, as discussed previously, the pressure to meet university expectations was passed on through exam boards to A-Levels, GCSEs and down through the curriculum (Gewirtz et al., 2019).

In several ways the extent of this influence was framed in ways that renders it problematic for climate change education. Participants discussed how disciplinary topics, specifically the sciences, were supported by networks or seemingly well-resourced advocacy organisations, whereas there was no similar network for climate change education. Furthermore, the strength and unity of the science discipline(s) was perceived (by Richard) to engender an inward-looking focus, as evidenced in a long-term curriculum development project that was cited by four participants. Whilst this project was reportedly well-advanced and had been subject to wide cross-disciplinary consultation, to date, its emphasis was largely constrained to the three science disciplines and, in relation to climate change, "they haven't done that yet" (Molly). Climate change was described as an "extra" (Ellen) that was not being "taken seriously" (Molly). Arguably, while influential organisations were making choices and using 'gravitas' to pursue other issues, such as the "imminent crisis" of perceived curriculum shortfalls relating to data and artificial intelligence (Alannah), climate change education was being left to languish.

Society, the British Computing Society, the Royal Statistical Society, and the Education Policy Alliance.

When considered in isolation, the positions of the science and geography disciplines could be justified. However, such an intra-disciplinary emphasis (what Hugh described as "turf protection") finds stakeholders attending to concerns *other than* climate change education. As Hugh commented:

> "There's a very strong principle there about why we have to get this [climate change response] right, that I think goes beyond what often goes on in the education system of lobby groups lobbying for their own discipline." (Hugh)

The disciplines' diverted gaze when it comes to education is arguably out of step with the needs of society and the environment. When coupled with the evident lack of attention being paid by the government, this is cause for concern for climate change education.

8.4.3 Funders lack a climate change education agenda

The third influential stakeholder category identified in the analysis was 'funders' of education research and practice, discussed in terms of large private funders[14] and public funding (e.g. government departments), as follows:

> "The influencers… are the funders at the end of the day. So, DfE is a big one. BEIS is a big one. Wellcome (Trust) is a big one." (Ambrosia)

In keeping with Braun and Clarke's (2006) guidance, thematic analysis captures important ideas, which are not necessarily identified in quantifiable terms. In this case, funders were mentioned less frequently than other stakeholders, yet related discussions indicated the important role they play in influencing climate change education policy, principally by *not* bringing the matter to the fore.

To explain, there was no evidence that funders were pursuing climate change education related agendas. The only evidence of current related funding was an instance of science education-related grants, whereby schools could choose climate change as a topic (Alannah). Whilst previous examples of funding for climate change-related environmental education were mentioned[15], the discontinuation of government funding[16] was attributed to the global financial crisis (2007-2008) and

[14] For example, the Wellcome Trust, the Education Endowment Fund, Nuffield Foundation.
[15] The Royal Society, Gatsby Foundation, Department for Education (DfE)
[16] The Department for Environment, Food and Rural Affairs (DEFRA) and the Department for International Development (DfID).

the change in the UK Government in 2010 (discussed in Chapter 3). When discussing government funding for programme delivery, participants highlighted constraints in relation to their ability to influence. They reported being engaged as contractors delivering projects under instruction, rather than being invited to feed into policy, or that their contracts included "anti-lobbying clauses" (Ambrosia) that prevented position-holders themselves from actively exerting their influence. In relation to funding research, Richard described how despite funders being motivated to support valuable research, they had not yet been prompted to pursue climate change education either by their stakeholders or through evidence from recent scientific reports (e.g. IPCC 2018). Funding for this PhD research aside[17], no other evidence of research funding relating to climate change education was uncovered.

Whilst there was no evidence that funders were directly influencing climate change education policy, the analysis did point to their indirect influence. That is, a rich discussion with Richard about funders indicated several ways that their influence stemmed from the capacity to make choices, that is: to choose research topics; to choose what knowledge to emphasise and develop; to choose leaders and expertise; to choose research methods; and to choose research settings (e.g. informal versus formal education). These choices appeared to be exercised cautiously and with deference to individuals and organisations' reputations and relationships, to advocate 'safely' based on solid evidence and money, in accordance with 'safe' areas of knowledge (e.g. wellbeing and computing education). Thus, despite their apparent capacity to influence, funders appear to be another stakeholder category whose attention is not directed towards climate change education.

8.4.4 Universities as influential and responsible, yet hindered

Universities were the fourth stakeholder category identified in the analysis. Position-holders described their roles in terms of research, teaching, outreach and initial teacher education (ITE). The university sector could possibly be conceptualised as part of or as straddling the above categories, that is, research is one element of the BEIS policy portfolio, and geography and science disciplines could incorporate the work that universities do. However, participants discussed universities as a distinct, albeit connected, sector. Universities were perceived as

[17] The Rosalind Driver Scholarship Fund, administered through the School of Education, Communication and Society at King's College, London.

influential in relation to climate change education owing to their central position within science networks and because of their contributions to policy influence (e.g. by contributing to curriculum consultations, publication of reports, policy analyses and policy recommendations). Contrasting with perspectives concerning the aforementioned stakeholders and discussed hereunder, participants also perceived universities to be responsible for influencing climate change education, but they encountered impediments when attempting to so.

8.4.4.1 Responsibility for influencing

Contrasting with the stakeholders already discussed, six participants emphasised universities' responsibility in relation to climate change education policy influence. For example, one said:

> "Academics should do more to influence. I think they have important things to say" (Edmond)

The responsibility of universities was described as being related to the government's positioning of them as businesses and employment training ground, the low profiling of them amongst the public, being "courageous" (Richard, Lawrence, Ada) in teaching and research as well as demonstrating "authentic leadership" (Lawrence) through personal and professional sustainability practice. In addition, universities were described as being responsible for critiquing the status quo, contributing their insights (Molly) and promulgating new ideas:

> "They need to shape the conversations that we need to have. To create the ideas and the space for those ideas to cross-fertilise and embed." (Lawrence)

On the grounds that society 'knows' about climate change, but does not know about the social implications, Lawrence positioned universities as responsible for moving beyond the "known unknowns" to the "unknown unknowns":

> "Isn't that what one might expect of a university, where there are no constraints on the search for new knowledge and new boundaries of knowledge?" (Lawrence)

Initial Teacher Education (ITE) was singled out as a key area of responsibility in relation to universities' climate change education influence, despite

ITE having had limited research attention paid to it (Rousell & Cutter-Mackenzie-Knowles, 2020). It was viewed as a key opportunity for building teachers climate change science knowledge, and to reach the "next generation of leaders" (Richard), that is, student teachers who would become department heads capable of influencing change in schools. Richard emphasised that ITE should challenge the conception that there is only time to teach a "fact-based curriculum and teaching to the test" and highlight the importance of climate change. He explained the importance of ITE as follows:

> "What's really important is to say, not just 'this matters and you [teachers] must do something about it', but 'this matters, and here's how you can do something about it'." (Richard)

Thus, universities responsibilities were discussed in terms that required them to challenge the norms of the policy landscape. Unsurprisingly, participants also identified several impediments that universities encountered when trying to do so.

8.4.4.2 Impediments to influence

Alongside the perceived responsibilities, the analysis did not identify universities to be influencing or leading climate change education, as exemplified by the following remark from a university based 'thought leader':

> "[I respond to requests] that sometimes lead to policy work, but I'm not, kind of, running around trying to find it." (Edmond)

Eight participants who worked in or alongside universities identified a combination of factors to be impeding influence. There were indications of a reluctance to get involved in climate change education, for instance, it appears that science academics avoided school education related work for fear it would "blunt their academic career… they thought this would be a black hole" (Theo). There was also a perceived lack of capacity to influence policy, which was attributed to a loss of influential and experienced academics (Richard). Most commonly, however, impediments seemed to be associated with various disconnects in the climate change education policy landscape and with neoliberally aligned factors, that I will now explain.

In relation to ITE, problems were noted in the fragmented national system of teacher education, between ITE and other departments or administrative areas of the university and in discipline-based, rather than interdisciplinary PGCE programmes (Edmond). Neoliberally aligned values, specifically the emphasis on performance and measurement that has been previously discussed, were also evident in the ways that ITE content was being aligned and driven by the disciplinary structure of the curriculum.

Beyond ITE, several other disconnects were perceived to impede universities' policy influence. For instance, it was held that academics did not have time to build the long-term, constructive, trusting relationships necessary for policy influence. Further, according to Hugh, where academics want to give full answers and present original findings within timeframes that align with good research processes, decision makers in "competitive" policy influencing environments want synthesis of results that support fast decision-making. He rationalised this as follows:

> "It's better that decision makers make decisions based on incomplete good quality knowledge rather than incomplete bad quality knowledge" (Hugh).

Moreover, these eight participants all highlighted that policy influencing from academics needed to couple rigorous and robust research with multi-disciplinary communication skills - "skills of the think tanks" (Hugh). However, some noted that it is uncommon for universities to have such teams and that translating research into suitable formats for policy tended to be beyond academics' available time and outside their skill set. Instead, universities' policy influence was perceived to be impeded by the mismatched "currencies" (Chris) of academia and policymaking. That is, that England's universities were driven by a 'currency' of published academic research, rather than by policy influence, and that published research is overlooked by policymakers who are unlikely to read academic journals. Whilst the potential for the *Research Excellence Framework (REF)* (Department for the Economy, 2019) to incentivise academics towards policy influence was noted - "we're being told to have an impact" (Edmond) – as discussed in the policy review, the *REF* pays little attention to climate change and none to its education. Indeed, there was a perception that the *REF* drove universities towards centrist ideas (Alona, Xavier, Edmond), as per the following extract:

> "In theory, academics should be trying to influence policy, because we should be guided towards that by the *REF*. What that does mean is it's a hell of a lot easier to influence policy, if you are, you know, the sort of, the political implications of your work are broadly centrist. … I slightly worry with the impact thing that it does, sort of, um, guide academics towards tinkering on the margins of society." (Xavier)

As such, the *REF* was perceived to hinder research exploring radical ideas with un-attributable impact.

Thus, the analysis indicated that universities were another stakeholder category lacking in climate change education influence. They were described as having responsibility in ways that other groups did not, a factor that might have been due to a bias in the sample whereby most position-holders had current or previous professional affiliations with universities. Moreover, the analysis also indicated how various impediments encountered by universities intersected and took on a recognisably neoliberal tone given their correlations with marketisation. For instance, the disconnectedness between the needs of policy influencers and academics, coupled with universities' drive for publications (consistent with neoliberal attributes of performance measurement and accountability) could drive research towards approved 'safe' knowledge and away from more marginal concerns of government, such as climate change education.

When considered along with the previous three stakeholder types, a picture starts to emerge of four seemingly powerful stakeholder groups that are not seeking to influence climate change education. Government stakeholders, led by the Department for Education and the Department of Business, Energy and Industrial Strategy, are not identified to be concentrating on climate change education, nor connected with position-holders in relation to it. The 'disciplines' of geography and science have been found to be more focused on their discipline than on climate change education, despite their evident capacity to exert influence. Moreover, there is also no evidence that large private or public funders have climate change education agendas, despite them (and particularly the large private funders) having the resources, gravitas and ability to make choices about agendas uniquely positioning them to do so. The Discussion chapter looks more closely at the

relationship between these four stakeholders and the effect of their collective lack of influence.

8.4.5 Environmental education organisations: influencing from the outside

Environmental education organisations were identified as a fifth category of stakeholders. Contrasting with other stakeholder groups, the three position-holders who worked in the environmental education sector (who all stated that they emphasised sustainability, rather than climate change in their work) identified ways they were trying to influence climate change education-related policy, that is to say, they were 'stepping up' to influence. They described themselves as: leading and contributing to networks or advocacy think tanks; promoting their work and lobbying political influencers through social media; and fostering a "social movement" (Josephine) through a campaign to change the purpose of education in the *Education Act 2011* (drawing on the retired *National Framework for Sustainable Schools* [discussed in Chapter 3] [see DCSF, 2008b, 2008a, 2008c]) to include:

> "To learn how to care for oneself, to care for others, and that means both here and globally, and care for the environment." (Josephine)

Notably, Alistair described non-government organisations in the UK, specifically the UK Youth Climate Coalition (UKYCC) as well as National Union of Students (NUS), as amongst the strongest climate change action lobbyists in the world:

> "They're the ones who lobby us and they want action and they'll be the protestors and they'll be the ones who are concerned about their future … they are the hardened and strong group on the agenda." (Alistair)

However, limited evidence of the environmental education sector's influence in relation to climate change education policy was found. Aside from one reference to The Wildlife Trust regarding its funding being tied to the *25-Year Plan* (DEFRA, 2018a), environmental education-related organisations were only mentioned in cases of personal involvement[18]. Whilst subject associations and learned societies were referenced by name by position-holders from different fields, no environmental

[18] UK Stakeholders for Sustainable Development (UKSSD) (mentioned by individuals with direct involvement as a potential influencer that had reached the outer limits of their influence); Sustainability and Environmental Education (SEEd), Sustainable Schools Alliance (SSA) (which disbanded in 2019), and English Learning for Sustainability Alliance (ELSA) (mentioned in relation to personal involvement), Natural England, mentioned by an employee within the sample.

education organisations were mentioned by people from outside the sector, despite there being numerous environmental education networks and organisations[19] in England that claim to support climate change education practice and to influence policy. Moreover, and as mentioned in Chapter 7, previous engagement from the environmental education sector was perceived by some from outside of the sector to be problematic and unhelpful to climate change education to the extent that, as Callie remarked:

> "Some of the stuff that was coming out of those organisations was so emotive, and so biased … I personally don't see it as a problem that those sorts of people aren't really engaging in climate change education anymore." (Callie)

The analysis provides several possible explanations for the environmental education sector's lack of influence. There were comments that it was because of political and funding instability, and because the sector was fragmented, competitive and resistant to collaboration, for example:

> "There's a fragmentation because of the large number of organisations with very specific goals but everybody, climate change is the thing that hangs everyone together. But how do you get that to work? Why does the read across not work? It's such a big problem." (Alannah)

Alannah went on to speculate that the lack of influence could be related to people in current positions of influence having seen (and participated in) previous environmental education initiatives, doubted the effects, and were not envisaging better alternatives. This points to another possible explanation, tied to the policy analysis, that could relate to shortcomings in the environmental education sector's professional pathways. As the policy analysis found, employment discourses within the climate change education policy landscape privilege STEM, industry and digital technology careers, without offering discursive or practical incentive for other career development, particularly careers that could potentially trouble the status quo.

In short, the evidence of policy influencing being attempted from the environmental education sector, where the sector is 'stepping up', might well be

[19] Sustainability and Environmental Education (SEEd), National Association for Environmental Education (NAEE), United Kingdom Stakeholders for Sustainable Development (UKSSD), London Environmental Educators Forum (LEEF), English Learning and Sustainability Alliance (ELSA), and the recently disbanded Sustainable Schools Alliance (SSA).

anticipated and is a welcome contrast to previous categories. However, the sector's fragmentation and disconnection from other stakeholders suggests that it is 'on the outer' when it comes to policy influence. The implications of this outsider status are considered further in the Discussion.

8.4.6 Schools as policy influencers

The final stakeholder category identified was schools, construed in terms of head teachers, teachers and students. There were no head teachers, teachers or students included in the sample, as explained in the Methods (Chapter 5), however, this stakeholder category is heavily implicated in the decisions and actions of the abovementioned stakeholder groups that all have a clearer mandate for policy influence. Correlating with the disconnection between education and climate change policy identified in the policy analysis, this section highlights disconnection, or even exclusion, that schools encounter regarding climate change education policy influence and that, in several ways, schools appear to be driven towards a low prioritisation of such education.

8.4.6.1 Head teachers and teachers

First to head teachers, whose influence in relation climate change education was described at a local scale, that is, that they are "pivotal" in the way that "they shape and influence the philosophy, the environment of the school" (Theo), the school community, and as enabling teacher creativity, innovation, exploration and risk-taking. Participants were sympathetic to the challenges head teachers face in leading their schools' and generating school cultures that could respond to climate change. Performance and accountability systems (such as the *Education Inspection Framework*) were perceived as deterrents to doing so, for instance:

> "How [head teachers] are evaluated and then calibrated is screaming at them 'don't do that!'" (Theo)

Convincing governing boards and school communities to change was also perceived to be an obstacle:

> "It has to be such a powerful reason for a change to something else that there's a lot of inertia against that." (Jon)

Despite position-holders perceiving benefits in head teachers contributing to climate change education policy, there was no evidence that they were engaged (or being engaged), either individually or through organisations, such as the Association of Head Teachers. Returning to questions raised earlier about the value of policy influence in engendering change (discussed in Subsection 8.4.1.2 above), Theo argued that empowering head teachers to develop school cultures resilient to policy shifts would be more valuable than trying to influence climate change education policy, as follows:

> "What we need is to get head teachers thinking, 'I'm emancipated to do this. I'm about the understanding, the learning, the cognition of the children in my care, and that may mean that I do some seemingly crazy things.' But actually, promoting learning and moving those learners to a point where they can really connect, might require something quite radical to happen." (Theo)

Moreover, teachers were also perceived to be valuable climate change education stakeholders, albeit oriented towards practice more so than policy influence. For example, they could act as audiences for climate change related initiatives or as contributors to practice design processes. Given that teachers' emphasis is on teaching practice, rather than policy influence, it is understandable that they were afforded a somewhat peripheral position within policy influence processes. However, arguably, such marginalisation reflects what Theo described as "entrenched" views that "teachers do not have the expertise to do this when, clearly, they do" (Theo). He argued that engaging teachers in policy processes, such as curriculum development, would result in a more cohesive, inter-disciplinary curriculum. In turn, this could support a more meaningful climate change response from education.

8.4.6.2 Students

Finally, I come to the students, the stakeholder category that is most prominently signalling a potential 'shift' in relation to climate change education policy influence. Students were described as contemporaries of climate change; that they have been hearing about it since they were born and "they're probably the first generation where it's beginning to happen" (Alistair). There was also a high level of concern expressed about the climate change-related burden that students would carry

into their futures and that they would be "left trying to undo the damage that's been done" (Nichola). These views accord with the previous chapter's discussion that position-holders recognised a role for climate change education in fostering students' agency so they can act on climate change in the future. In addition, perspectives addressed students' influence in the present. Seven participants emphasised students' high levels of engagement, interest and capability relating to climate change and climate change-related action. Students were described as "climate literate" (Alistair) and as having "absolutely amazing" ideas for society's response to climate change, as follows:

> "And why shouldn't they? … They're perfectly formed and have a brain and can work things out and if you're really passionate about something and engaged, you can contribute … I think our children have got a hell of a lot to teach us about this, in terms of their values and in terms of the importance which they place on this. They have a … much more enlightened view on this than we do and if there's one thing I've learnt talking to primary school children, it is how important it is to them, how it isn't important to my generation." (Theo)

A range of examples of primary and early secondary students participating in sustainability actions and facilitating others' actions was discussed, for instance, by bringing adults together in schools, or as "mini-ambassadors" (Nichola) operating between schools and families. Hence, in several ways, position-holders were alert to students' current situations in terms of experiencing climate change education and influencing climate change related action.

Notably, the recent civil action taken by students contrasts starkly with the lack of influencing for climate change education that was evident amongst most other stakeholder categories. The crowds of students participating in multiple strikes has been illustrative of high levels of engagement, empowerment and willingness to influence. Arguably, these contemporaries of climate change have been 'stepping up' to do so. As explained earlier, most of the interviews for this research were held before the UK strikes started. Regarding student action (the strikes and more generally relating to climate change action), diverse views were expressed amongst position-holders. Some (n = 5) were generally supportive, if in some cases somewhat muted, with one more positive comment being:

> "The idea that children missing a few hours of geometry or physical education to ring the alarm bells and wake up our political system is a wasted opportunity or the wrong thing to do, just seems churlish. It seems absurd and mean-minded." (Samuel)

Some participants were motivated by the strikes as impetus for their organisation's initiatives. Others were inspired by the students' efforts to influence government on climate change, arguing that student demands were justified:

> "It seems that they have a sense that they have been failed by who's come before them and that they don't need to still listen to them anymore. Kind of, like, why the hell should they?" (Xavier)

Others were more sceptical of student engagement in activism, claiming that proponents of student agency were saying "'young people, you must sort this problem out for the rest of the world'" (Rex). Arguably, such cynicism discredits students' advocacy efforts, and those who support them, thereby promulgating attitudes that can further hamper student agency. Similarly, questions were raised about the role of schools in civil action in terms of how it could hamper efforts, for example:

> "The idea of students being sort of fired up and committed to something is great … but with caveats… that while they can be enabled by schools they shouldn't be driven by schools." (Jon)

Harking back to the discussion in the previous chapter, Callie emphasised that schools should attend to learning <u>about</u> climate change in science and geography, and then "stand back":

> "Give people the core understanding of the processes and the impacts and then, maybe as a climate scientist I would want … to stand back and let anything else then develop independently." (Callie)

Several participants (n = 5) who tended to position climate change responses within the adult, rather than young people's world, located the levers for addressing climate change within larger systems and government and accordingly, were circumspect about the striking students' influence, for instance:

> "If the pendulum is to swing … who's going to push it? Who are the people who are going to be pushing it? Well, it's inspiring that school kids are organised, but that wouldn't be enough." (Richard)

Whilst position-holders who are experienced in policy influence have valuable insights to offer, it could be argued that their views are somewhat constrained by the system in which they have been successful in developing a career. As such, they might be less aware of, let alone less likely to acknowledge or support alternatives. Whilst there was unanimous recognition that more needed to be done to address climate change, some participants views seemed to belittle or diminish the actions of students in ways that mirrored key characteristics of the policy landscape: that is, of deference and 'standing back' and of low prioritisation of climate change education. Such views could be construed as hampering climate change education policy influence by preventing people from recognising their potential influence and, thus, from wielding it. The following chapter discusses whether deeper exploration of student action, or activism, could indeed be useful for realising greater climate change education policy influence.

8.5 Summary

This third and final chapter of the findings has examined the nature of influence as it relates to climate change education policy in England. The chapter began by introducing six salient features of climate change education policy influence: low prioritisation of climate change education, neoliberal attributes, messiness, disconnectedness, deference and restraint amongst potential influencers, and indications of 'shifts'. This was followed by a discussion of a range of influencing techniques that position-holders employed, most commonly relative to other areas of policy: practical tools, evidence, connectedness as well as 'standing back' and 'stepping up' stances. In the final part of the chapter, the six stakeholder categories that were identified in the analysis were discussed along with the limited influencing that was evident amongst them. Whilst each case of inaction could be rationalised on an individual basis, when viewed collectively, a picture emerges, whereby attention has in the main been directed elsewhere: techniques of influence are directed towards other priorities (e.g. evidence as 'proof' rather than to explore possibilities); and where strong connections exist, they have been attending to other concerns. That said, the student actions appear as a bright spot amongst the analysis

and as contrasting with most of the stances of the position-holders and stakeholders. In sum, the analysis of position-holders' influence contributes further insight into the climate change education policy landscape in England. The following chapter draws together various threads from across the thesis to address the research questions directly, to explore the governmentalities of climate change education and, inspired by the students, to explore how activism could be a useful lens to realise more climate change education policy influence.

Chapter 9. Discussion: Governmentalities of climate change education

9.1 Introduction

This chapter, the final part of my thesis, weaves together threads from the literature (Chapters 2, 3 and 4) and the findings of the empirical study (Chapters 6, 7 and 8) to discuss the 'governmentalities' (Foucault, 1991a) of climate change education and explore what this insight offers for the future of climate change education in England. The chapter unfolds as follows. Section 9.2 reflects on the findings chapters by responding to the first two research questions:

> RQ1: How is climate change education being positioned in the policy landscape and by position holders?
>
> RQ2: Who is influencing climate change education policy and how is that influence being wielded?

Section 9.3 brings in the Foucauldian lens and, drawing from the historical and contemporary perspectives laid out in the research, it explores the governmentalities of climate change education. In so doing, this section responds to the third research question:

> RQ3: What factors are 'governing' climate change education in England?

Together, these two sections serve to illuminate the various complexities associated with the nature of the climate change education policy landscape in England.

Whilst there are no straightforward solutions, Sections 9.4 and 9.5 consider what this insight offers for thinking about the future of climate change education. Together, they address the fourth research question:

> RQ4: What insight does this research offer for the future of climate change education in England?

Section 9.4 takes the governmentalities as the departure point and proposes three avenues that could support progress in the field. Section 9.5 focuses on the lack of influence evident amongst position-holders. It explores potential affordances of viewing policy influence through a lens of activism, informed by the literature and in

light of the recent climate change civil action. The thesis concludes with a discussion of implications arising from the research and opportunities for further exploration, in Section 9.6, followed by some brief closing remarks.

9.2 Positioning and influencing climate change education policy

The discussion begins by drawing on the research findings to address the first two research questions. Expanding on the chapter summaries, Subsection 9.2.1 discusses the positioning of climate change education in the policy landscape (RQ1), and Subsection 9.2.2 is concerned with how influence is being wielded (RQ2).

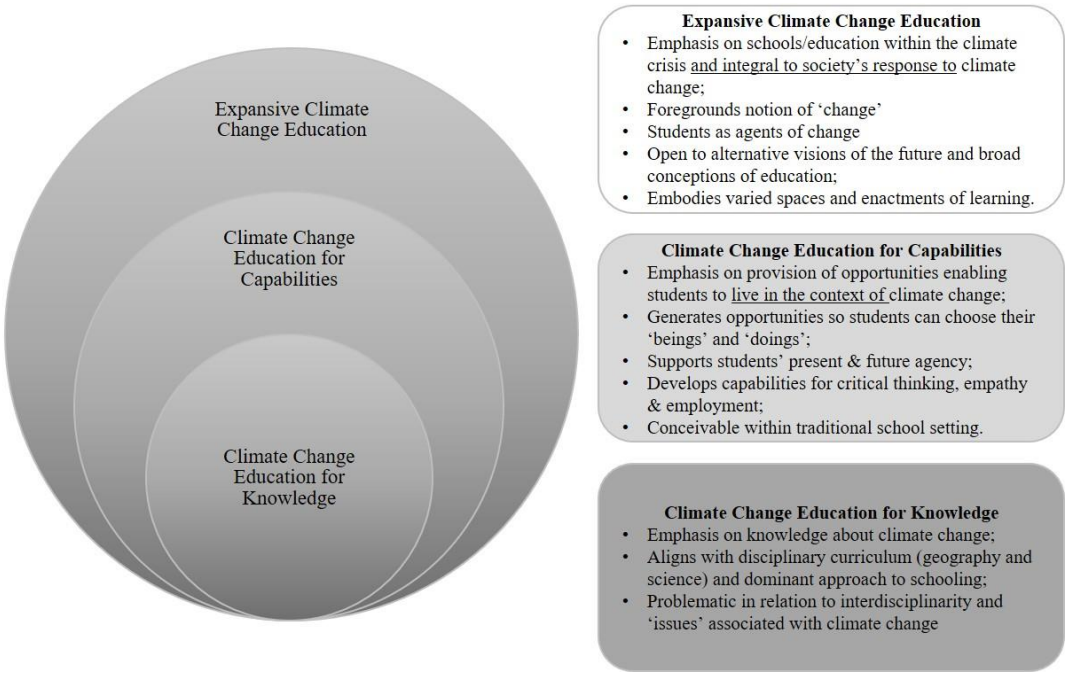
9.2.1 Climate change education has a low profile in the policy landscape

In short, the research found that climate change education has not materialised as being essential and that it is lacking across all dimensions of the policy landscape. The policy analysis (Chapter 6) found that whilst some attention is paid within international policies (e.g. Article 12 of the *Paris Agreement*) and even though the UK has espoused a leadership role in relation to those policies, a commitment to climate change education has not been carried through to the national policy landscape. Overall, climate change has a low profile in education policies, education has a low profile in climate change policies and the climate crisis is largely out of sight. Arguably, the low profile of climate change in the curriculum is particularly troubling given the curriculum's central role in school education in England.

Analysis of position-holder perspectives (Chapter 7) identified a broad consensus that the education sector, and schools in particular, have a role to play in society's response to climate change, yet, the nature of that role is not straightforward. The multifariousness of the concept of climate change education was highlighted, thus concording with views from the literature (discussed in Chapter 4), and that individuals' views are informed by complex macro-, meso- and micro-level factors. In keeping with the Foucauldian theoretical framework, this analysis sought system-level insight to support exploration of underlying discourses and connectivities, and thus, did not seek to critique individuals' positions. Hence, I organised perspectives into three nested conceptualisations of climate change education (Figure 4 below) that represent grouped perspectives, rather than categories of individuals. In many cases, the perspectives of individual position-

holders straddled the identified nests. As a heuristic, this nested model offers a mechanism for supporting evaluation of existing approaches to climate change education and to envisage possible alternative ones.

Figure 4: Conceptualisations of climate change education (repeated)



The first conceptualisation, *Climate Change Education for Knowledge*, reflects a commonly discussed aspect of such education: the importance of knowledge about climate change, resembling Lucas' (1972) education about the environment. Eighteen out of the 24 position-holders discussed climate change education in these terms. Relevant knowledge was primarily framed in terms of science and geography disciplines and discussed in terms of curriculum-based school education. Arguably, these perspectives correspond with a 'knowledge-based approach' to education that Young (2013) describes in terms of school-based learning being organised into subjects or disciplines and articulated in a curriculum. As discussed in Chapter 3, this approach took shape in the *Education Reform Act 1988* and gained strength as a result of the 2013 curriculum review. Yet, multiple criticisms and concerns raised by position-holders indicate that *Climate Change Education for Knowledge* is insufficient for providing students with the best chance of responding to the climate crisis. Chief amongst the position-holder concerns was that the interdisciplinary nature of climate change makes the topic ill-suited to a disciplinary curriculum, and that the multiple types of knowledge, including the

complex ethical and justice related questions it raises, finds climate change education extending beyond disciplinary approaches.

Moving outwards, the second ring of the nested model is *Climate Change Education for Capabilities*. Perspectives shared by 18 position-holders coalesced here. This conceptualisation, which draws on the theorisation of the capabilities approach (Robeyns, 2005; Saito, 2003; Sen, 1980, 2010), comprises a more expansive purpose for education in the context of climate change than knowledge. Here, climate change knowledge remains centrally important, but rather than emphasising the importance of knowledge attainment about climate change, these perspectives hold the salience of education as providing opportunities to live in a context of climate change. The emphasis here is that climate change education should engender opportunities for students to make choices and deliberate upon what they value in relation to the phenomenon. The analysis identified three prominent capabilities amongst the discussions: capabilities for critical thinking, empathy, and employment, with the lattermost echoing the orientation of education towards work which has been evident in recent history and in the policy landscape. Notably, whilst position-holders tended to emphasise opportunities in relation to young people's future agency, that is, to their future freedoms and adult lives, students' climate change-related agency in the present was also discussed. Hence, *Climate Change Education for Capabilities* resonates with views in the research literature for climate change education to develop student capabilities in ways that recognise a broader social purpose (Davies & Pitt, 2010; Dei, 2010; González-Gaudiano & Meira-Cartea, 2010; Kagawa & Selby, 2013a). The conceptualisation also offers the scope to position students as agents of change (Rousell & Cutter-Mackenzie-Knowles, 2020; Waldron et al., 2016). Whilst this raises questions about in what ways could or should education enable students to contribute meaningfully to policy making processes in the present, arguably, the capabilities approach could support deeper exploration of these questions and an orientation for climate change education that reaches beyond knowledge attainment.

The outer-most conceptualisation, that I termed *Expansive Climate Change Education,* positions schools within the climate crisis and as integral to society's response. Perspectives coalescing here recognise the crucial role of knowledge, and the importance of developing young people's capabilities for their futures as being part of climate change education. Thus, the conceptualisation includes the two inner

nests described above. In addition, the perspectives captured here also highlight the need for a reorientation and re-emphasis of schooling that takes a broader societal context and social purpose into account. Hence, *Expansive Climate Change Education* describes education in a context where climate change will be one of many concurrent changes, that is, a context of 'wicked problems' or challenges that are composed of multiple interlinked issues, which lack clear solutions (Kopnina, 2020 referring to Rittel & Webber, 1973). This conceptualisation reorients education around a notion of 'change', rather than around static knowledge. It embodies, rather than merely appends, different spaces for learning (e.g. outdoor learning) and different enactments of learning (e.g. activism). It also echoes many of the views within the environmental education literature, whereby climate change education should, for instance, be open to alternative educational visions and approaches, where climate change education should accommodate and embrace multifariousness, and where students should be positioned not as recipients of knowledge, but rather, as critical agents of change. Notably, this conceptualisation also echoes views from other areas of the literature, such as Hodson's proposal for a science education to "produce activists", described as:

> "… people who will fight for what is right, good and just; people who will work to re-fashion society along more socially-just lines; people who will work vigorously in the best interests of the biosphere." (Hodson, 2003, p. 645)

Thus, *Expansive Climate Change Education* resembles a dismantling of conceptions of education that are dominated by attainment of disciplinary knowledge. Instead, it supports the envisaging of 'more!' in the context of climate change. Notably, this conceptualisation, when compared with the inner two, reflects views from the fewest participants. The lesser number of views could be explained by looking to the history of the policy landscape in England, that is, to the gradual narrowing of 'what counts' as formal education that has occurred since the 1960s, that has ultimately marginalised environmental and climate change education. It could also be explained theoretically whereby views such as these sit uncomfortably with the web of conditions and tend to be silenced, a matter I return to in Section 9.3 below.

9.2.2 A lack of influencing relating to climate change education policy

This section turns to my second research question and addresses how influence is wielded within the policy landscape:

> RQ2: Who is influencing climate change education policy in England and how is that influence being wielded?

Whilst one might consider it self-evident that position-holders engage in influencing, there was a notable lack of evidence that position-holders were seeking to influence climate change education policy. Yet, despite limited influencing in relation to climate change education, the analysis found that position-holders were doing so in other areas of the policy landscape. The investigation involved considering how influence was enacted, the features of influence in the policy landscape, the techniques used by position-holders to influence, and by whom they are exercised. This section briefly recaps the findings, followed by discussion on the interplay amongst these elements in relation to climate change education policy influence in England.

The analysis identified six features that describe *what* influence looks like regarding climate change education policy. The first captures the overall picture: a low prioritisation of climate change education. The next four arguably contribute to how and why this low prioritisation exists: neoliberally aligned attributes; messiness in the policy landscape; disconnection amongst position-holders and stakeholders; and evidence of deference and restraint. The sixth feature, offering some hope, was an indication of 'shifts'. Insight was also provided into the *how* of influence in terms of the techniques that participants used to influence policy, these being: practical tools, evidence, political participation, connectedness and 'standing back' / 'stepping up' stances. Stances aside, the techniques were predominantly described in relation to other areas of policy. The final part of the analysis concerned *who* is involved in climate change education influence. Six stakeholder categories were identified as playing a strategic role in relation to climate change education policy. The stakeholders - government, disciplines, funders, universities, environmental education sector, schools - were identified through the analysis of participant data, by reflecting on position-holders' professional settings, and through analysis of policy texts. Consistent with the majority of the position-holders, there was limited

evidence that stakeholders were seeking to influence climate change education policy.

If the ways in which the acts and the actors are intersecting are considered, it is possible to develop a rich understanding of climate change education. In Foucauldian terms, the nature of the intersections helps us to understand how the 'fine channels' of power work to hold climate change in the position it is. To explain, the features and techniques intersected in the ways position-holders influenced, or did not influence, policy. Position-holders who appeared to be in strong positions of influence by virtue of their own or their organisation's connectedness, ability to generate evidence or to implement practical tools (e.g. meetings with senior civil servants or conferences organised around particular topics) were not identified as influencing climate change education, that is to say, most were 'standing back'. Meanwhile, amongst the position-holders who were 'stepping up' to influence climate change-related education, even to a limited extent (e.g. by tagging MPs in social media campaigns, or proposing campaigns to change policy), there was limited evidence that they were connected with other position-holders or with the more influential stakeholders (explored further below). That is to say, the position-holders who were 'stepping up' tended to lack the resources to influence.

Reflecting on the stakeholders provides additional insight. In accordance with a Foucauldian understanding (Foucault, 1980c), the analysis found that power was indeed dispersed and that it was operating "inside, outside and alongside the state" (Ferreira, 2009, p. 610). That is to say, whilst the administrative arms of government were perceived to be influential in relation to climate change education, so were several other stakeholder categories. Notably, it emerged that the capacity for influence tended to be concentrated amongst four of the stakeholder categories - government, disciplines, funders and universities – who, by virtue of various interrelations within the policy landscape, formed a 'mega-group' of stakeholders. The mega-group was found to be related through funding structures, mutually reinforcing agendas and discursive patternings (explored further in Section 9.3 below). Like the position-holders above, one might regard 'stakeholders' as synonymous with influencers, however, the research has found that not to be the case. Significantly, there was very little evidence that members of the mega-group were proactively influencing climate change education. Whilst stakeholders' (and

individual position-holders) lack of influence could arguably be defended in terms of their individual, organisational or sectoral objectives, when viewed as a whole, the lack of influencing evident amongst the mega-group is less defensible. When conceived as a group, the mega-group of stakeholders essentially occupy a position that could be construed as involving a concordant level of responsibility. Yet, where climate change education lies outside the central concerns of the mega-group, not only is their collective responsibility not being enacted but the significant power vested in the group is therefore keeping climate change education at bay. If this responsibility is not enacted, it could be reasonable to hold them as somewhat accountable for the gap. Such insight offers a further explanation as to why climate change education is in the state it is and also explains where much of the responsibility lies for the creation and sustaining of the deficiencies in the policy landscape.

The remaining two stakeholder groups, the environmental education sector and schools, sat outside the mega-group of stakeholders. Whilst there were indications of 'stepping up' stances amongst these stakeholders, the analysis suggested that the effects of such efforts were limited. The environmental education sector, which, as discussed in Chapter 3, has been plagued by marginalisation since the 1960s seemed largely disconnected from the mega-group. Ever since Rachel Carson's *Silent Spring* (1962) and through the institutionalising of education and climate change, environmental education has been peripherally positioned in education policy, being associated with a 'legitimizing discourse' (Berryman & Sauvé, 2013). In the next section I discuss how the concept of 'governmentalities' supports a deeper understanding of this persistently peripheral position and, Section 9.5 considers whether it could and/or should be changed. In relation to the schools stakeholder group, the empirical study found that it too was removed from climate change education policy influence. That is, there was no evidence amongst position-holder perspectives that schools were influencing such policy, by invitation or of their own volition. Indeed, the policy landscape pulls schools towards testing and accounting regimes aligned with the mega-group of stakeholders thereby schools emerged as somewhat subservient to the mega-group. Arguably, the policy landscape draws schools away from potential climate change education policy influence, be that at a local (school) level or in a broader policy context. As explained in the Methods (Chapter 5), this group was not included in the sample,

however, the analysis revealed they are heavily implicated in the decisions and actions of others, particularly those of the mega-group.

However, recent civil action, led by students and joined by some teachers, indicates that some within this schools stakeholder group are eager to disrupt the policy landscape and are willing to act to do so. Activists have sought to intervene in policy influence processes and as indicated by the sequence of events and responses described in Chapter 3, appear to have had some effect. Looking more closely at the activists alongside other position-holders, it appears that their prioritisation of climate change education contrasts with the low prioritisation amongst position-holders and the mega-group of stakeholders. Also, of note is that the techniques that position-holders describe as being important for influence (that is, practical tools, evidence, political participation, connectedness) mirror the techniques being employed by activists. This reveals that, whilst their priorities might differ, the processes of activism and influence are not far apart and that further consideration of influence alongside activism could provide insight contributing to progress in the field. This is the focus of the discussion in Section 9.5.

In sum, the research found the policy landscape to be populated by position-holders who are not wielding influence in relation to climate change education policy. Whilst there are multiple stakeholder groups, the majority are intermeshed into a mega-group of stakeholders that, like shoals of fish, are swimming in the same direction. The two outliers are adversely affected by the mega-group, in that their practice is constrained and their voices are quietened. Arguably, those who want to influence lack the gravitas to do so, whilst those possessing it appear disinclined. Turning to the notion of 'governmentalities', as I will now do, helps to explain how this situation has come to be and how it is held in place.

9.3 The governmentalities of climate change education in England

The above discussion, stemming predominantly from the analysis of policy texts and position-holder perspectives, identifies climate change education to be out of focus across the policy landscape. This section views this situation through a Foucauldian lens to illuminate the governmentalities of climate change education in England, thereby helping to clarify how this lack of focus has come to be. In so doing, it addresses my third research question:

RQ3: What factors are 'governing' climate change education in England?

Here, the concept of a 'web of conditions' is helpful. As introduced in Chapter 2, the web governs what is said and done, what is conserved, remembered or appropriated, and what is unsayable and made invisible (Foucault, 1991b). It makes certain situations possible at given moments by imposing rules and constituting reasoning and it is "where the planned and the taken for granted meet and interconnect" (Foucault, 1991c, p. 75). Thus, the concept of the web supports exploration of the interplaying themes and issues arising from the analysis, and their connections with history, which helps to explain how climate change education has come to be positioned as it has today.

This section discusses three conditions that are arguably contributing to and constitutive of the web, thereby governing climate change education in England. The first two concern discursive patternings evident in the policy landscape: Subsection 9.3.1 discusses the neoliberally aligned discourse, whilst Subsection 9.3.2 considers the inconsistent discourse relating to leadership. The third condition, discussed in Subsection 9.3.3, concerns the effects of the policy landscape that is simultaneously fragmented and focused on management. Construed in terms of governmentalities, these conditions interact and work cumulatively to govern the *mentalities* associated with climate change education in a way that prevents it from being brought into focus. They reveal the problem, as articulated by Faith:

> "It's not really about what we should be doing, it's about what we're being prevented from doing." (Faith)

9.3.1 Neoliberal discursive patternings

The first condition relates to the widespread neoliberal discursive patternings that were evident in policy texts at both international and national levels and amongst position-holders perspectives. As shown in Chapter 3, the neoliberal orientation towards market-forces and economic growth has long been evident in international and national policies, and its influence on the purpose and approaches to education, and environmental education, have been widely problematised in the literature (e.g. Aikens et al., 2016; McKenzie et al., 2015; Sterling, 2017). This section discusses how neoliberal discursive patternings are enduring in the policy landscape by permeating characterisations of climate change, education and the

natural environment, thereby governing the position and understandings of climate change education.

First, the neoliberal patternings that are evident in climate change-related policy are governing what climate change education can be. The patternings are particularly noteworthy within BEIS policies that have a broad reach into England's climate change response through industry, science and research, and higher education. These policies associate STEM with innovation and the economy more strongly than addressing the climate crisis, an orientation that has been consistent for UK governments over several decades. In so doing, the STEM agenda is wedded to business and market interests which, according to Tannock (2020), threatens efforts to tackle the global climate crisis. Given BEIS' responsibility in relation to climate change, including as the UK lead on *Action for Climate Empowerment*, or *ACE* (a term denoting the work associated with Article 6 of the *UNFCCC* and Article 12 of the *Paris Agreement*), this orientation is troubling for its education, because it creates the context, or the set of conditions, that govern what climate change education can be. As Hursh, Henderson and Greenwood discuss, placing education and the environment in the "realm of techno-science" (2015, p. 308) results in a fixation on seemingly apolitical marketised responses and secures the "underlying political and economic rationalities and ideologies" (ibid.) of neoliberalism. What becomes sayable about climate change education must align with the BEIS' climate change response oriented around STEM, an agenda that is oriented towards markets. In so doing, climate change education can only be conceived of and enacted in forms that are consistent with neoliberal, market-oriented values.

The neoliberal discursive patternings are also instrumental in the way that climate change education is governed in England's education policies. As discussed in Chapter 3, environmental education scholars have criticised the application of neoliberal agendas in education. Jickling and Wals (2008), for instance, have argued that these agendas orient students towards future visions dominated by participation in employment and conceived in terms of perpetual economic growth. In this case, the pervasive neoliberally aligned agenda conceptually excludes alternative visions for the future, for education and for climate change education. In addition, England's model of schooling that, as discussed in the policy analysis, is organised around a subject-segregated, linear curriculum oriented towards assessment is structurally constraining climate change education. That is, the subject-segregation and

assessment-orientation of the curriculum hinders the incorporation of multiple knowledge types (Kagawa & Selby, 2010; Ojala, 2012; Pihkala, 2017) and locally responsive and contextual approaches (Davies & Pitt, 2010; Lotz-Sisitka, 2013; Rousell & Cutter-Mackenzie-Knowles, 2020) as are called for in the literature. Furthermore, climate change education in any form other than knowledge acquisition is precluded by conceptions of educational quality that are measured in terms of assessment outcomes alongside measures of effective and efficient school management. Perpetual performance measurement, a recognised tenet of neoliberally-aligned education (Ball, 2013), has been found to constrain teachers flexibility and their ability to respond to the diverse needs of students; indeed, it has been found to be "incompatible with quality improvement" (Gewirtz et al., 2019, p. 19). Thus, it could be reasonably asserted that the performance culture that constrains teachers' flexibility and responsiveness to diversity, would simultaneously impede them from exploring knowledge and issues associated with climate change in open-ended ways. Whilst Bangay and Blum (2010) have drawn attention to the potential synchronicity between climate change education and quality education, the quality agenda is dominated by performance metrics aligned with neoliberal values. Hence, not only would it be problematic to wed climate change education to the current quality agenda, in view of the requirements discussed in Chapter 4, climate change education and the current quality agenda appear to be largely incompatible.

A third way that the neoliberal discursive tendencies are evident concerns the way the natural environment is appropriated across the policy landscape. It is frequently couched in a context of economic growth, being economically appropriated and anthropocentrically oriented. That is to say, in education policy, the natural environment is largely 'othered'. Reiterating Glackin and King's (2020) finding concerning the environmental education policy landscape, my analysis found that the curriculum emphasises learning <u>about</u> the environment, more so than learning <u>in</u> the environment (Lucas, 1972), and whilst some position-holders' talked of learning <u>in</u> the outdoors or food growing, explicit advocacy <u>for</u> the natural environment or an alertness to its intrinsic value was missing. Hence, the policy landscape lacks an eco-orientation and indeed, it largely quietens or overlooks the natural environment. This landscape does not give a sense of the intricate and fundamental connectedness or 'oneness' of humans and the natural environment that

should be part of climate change education (González-Gaudiano & Meira-Cartea, 2010; Kopnina, 2012; Selby & Kagawa, 2010). In fact, the policy landscape resembles what has been referred to as human 'arrogance' regarding the crisis (Orr, 2017), where the value of more-than-human species is conceived in relation to humans, whilst the rights, inherent value, and suffering of more-than-humans at the hands of humans, is disregarded. According to Lakoff (2010), conceptualising nature as 'other' can mean that harm or collapse of the natural environment can feel quite alien and removed from humans. Hence, the likelihood that people might act for the natural environment, action that is inextricably linked to action that might help to address the climate crisis, is drowned out by omnipresent anthropocentric values.

Echoing earlier remarks about the influence of position-holders and stakeholders, when viewed separately, individual policies' orientations towards economic growth and market-based mechanisms might seem justifiable in the context of their ministries and target audiences. However, the pervasiveness of the neoliberally aligned discursive patternings and what they render as unsayable, is highly problematic if climate change education is to help young people to address the climate crisis. As Gough (2016) argues, neoliberal agendas lie at the heart of the causes of climate change, yet the patternings only allow climate change education to be viewed from within a neoliberally-aligned landscape. Not only are the neoliberally aligned policies rationalisable on the basis of the web, for they also reinforce those same rationalities. Thus, the policy landscape is blinkered to perspectives other than economic growth, with dialogue about other types of climate change education, or other futures, being squeezed out. When coupled with the 'soft governance' (Læssøe, Schnack, et al., 2009) that, as I discussed in earlier chapters, has long troubled environment-related education, policies relating to climate change education are easily side-lined.

9.3.2 An inconsistent leadership discourse

The second condition relates to a leadership discourse that has been, and continues to be, punctuated by gaps and inconsistencies regarding climate change and climate change education. Here, the usefulness of the Foucauldian lenses of policy historiography and policy archaeology becomes apparent. That is, deeper insight into how the present-day inconsistencies have come to be can be afforded by drawing on the history of the present of climate change education (Chapter 3) and

from the 'architecture of policy positions' explored in the analysis of influence (Chapter 8).

Since the institutionalisation of the 'climate as catastrophe' discourse in the UN processes of the 1980s (Hulme, 2008), the UK government's response to climate change has been coupled with a discourse of international leadership, yet has failed to produce a climate change education policy. Despite international agreements including climate change education (albeit with more focused attention on countries with developing economies and on behaviour change, awareness raising and skills and training approaches), the national policy gap highlights fissures between global and national governance on climate change. It also makes clear that climate change education is not considered a crucial aspect of the UK's climate change leadership. The national policy landscape largely overlooks any notion of a responsibility for climate change education, and when it does consider it, responses are limited to an alignment with STEM and future workforce participation, thus aligning it with the neoliberal discursive patternings.

The inconsistency in the national climate change-related leadership discourse has played out in relation to education in several ways. Whilst previous national 'highpoints' for the environmental education sector have corresponded with highpoints for UK climate change leadership (e.g. the *National Framework for Sustainable Schools* was introduced in 2006 and was soon followed by the *Climate Change Act 2008*), the links between climate change and education have generally been weak and the government's position seemingly paradoxical. Events related to and coinciding with the 2013 curriculum review are particularly illustrative in this regard. To explain, the *National Framework for Sustainable Schools* ceased in 2010. Ironically, shortly thereafter, Prime Minister Cameron became a co-chair of a high level panel to develop the first iteration of the Sustainable Development Goals (2012-2013) (UN, 2015b). Meanwhile, amidst a furore surrounding reports that the Secretary of State for Education, Michael Gove, had sought to remove climate change from the curriculum, environmental education was removed from the curriculum as a cross-curricular priority. As mentioned above, the curriculum that resulted from the 2013 review positions a knowledge-based education as core to pupils' futures (Alexander, 2014; Young, 2013). In so doing, it falls short in terms of climate change leadership and it falls short in relation to the scholarly views on what climate change education should be. Moreover, it arguably falls short in offering

what Young claims to be the right of all pupils to have "access to the best knowledge we have in any field of study they engage in" (2013, p. 115). It overlooks the severity of the climate crisis and responsibility for causes of climate change, instead repeatedly highlighting "uncertainties in the evidence" (KS4 Chemistry [DfE, 2014] and GCSE Combined [DfE, 2015b] and Single Science [DfE, 2015a]). Furthermore, the *Top Tips for Sustainability in Schools* document (DfE, 2012), a legacy of Sustainable Schools that lingers in the form of DfE guidance for schools on sustainability, acknowledges that "many *pupils* hold strong concerns about climate change" (DfE, 2012, p. 2), yet it merely encourages schools to act "should schools *choose* to" (2012, p. 1) (italics added). Hence, the onus is entirely on schools and government leadership is missing. In 2017, the Environmental Audit Committee also criticised the government's lack of leadership on the SDGs:

> "The Sustainable Development Goals represent a positive and ambitious commitment to develop sustainably from this generation to the next. We will only achieve the Goals if the Government provides strong leadership and a high level of ambition from the very top - something which has been lacking. There is no voice at the top of Government speaking for the long-term aspirations embodied in the Goals and the interests of future generations." (2017, p. 3)

So, just as the expressed leadership on climate change has not translated into climate change education, the expressed leadership on sustainable development has also been found wanting in practice. Hence, in addition to climate change education being found to be falling through the gaps, issues of accountability and culpability relating to pressing global concerns are also exposed as wanting.

It is possible to construe leadership shortfalls in policy texts as those of the state, thereby blaming government(s) for failing to ameliorate the climate crisis. Yet, as discussed in Chapter 2, Foucault contends that the role of the state is overrated (1991a) and that power is contained within, and works through, 'ensembles of power' constituted by various actors and discourses. Therefore, instead of hoping that government will act in ways that might resolve the crisis, a broader field of vision is needed to understand the 'architecture of policy positions' and thus, to identify where responsibility and culpability lies. Looking to the position-holders stances, as discussed in Chapter 7 and in Subsection 9.2.2 above, is helpful in this regard, as they reveal that the marginalisation of climate change education is further

secured by an evident lack of activity in relation to climate change education. Arguably, the stances amongst those position-holders who were 'standing back', particularly those from within the mega-group of stakeholders, are particularly enlightening in terms of the ways that they indicated deference and restraint, even amongst those who were well-connected, had choices, and access to techniques of influence. Whilst some of these position-holders felt they should do more, that they should 'step up', there was limited evidence of them doing so. Instead, there were comments that "it's not our job" (Ambrosia), not their "focus" (Edmond, Rex, Callie), they are not being called upon to influence by their stakeholders (Richard) or they contend that others are better placed to address the issue (Alannah). Even the only position-holder from within the mega-group whose actions resembled 'stepping up' for climate change education during the 2013 curriculum review, deferred to the views of learned societies to decide whether more influencing was needed:

> "When I talked to the [learned societies] about the new curriculum, they had said that they were satisfied that the new arrangements were sufficient. And I was happy too, because they have more of an understanding." (Hugh)

Whilst it is reasonable that organisations with subject expertise are consulted, the extract illustrates the 'fine channels of power' holding climate change in position. This position is further secured by the 'fine channels of power' framing the role of teachers:

> "… and it's probably not a good phrase, but geography teachers are not the sort of paramilitary wing of the environmental NGO community. And the environmental NGO community have a legitimate and proper place in this debate, but it's not for geography teachers just to take that and put it into an educational context in the classroom." (Rex)

To 'step up' might require position-holders to be less deferential, to challenge or disrupt the norms of their organisations and to choose using their job's influence to make climate change education policy a priority. Whilst doing so could introduce risks to individuals' positions of power or influence, arguably, it is necessary to counter the prevailing governmentalities. I return to this discussion, and explore potential avenues for progress, in Section 9.4 below.

A broader field of vision also takes in the leadership and responsibility of stakeholders, including the mega-group of stakeholders, whose members I contend are particularly implicated in the current positioning of climate change education. Whilst apportioning responsibility in this way introduces hefty moral questions that extend beyond the scope of this research, if change is to occur, it is arguably necessary to highlight the power that is held by the mega-group and the leadership responsibility that consequently falls to individuals within it. Whilst all individuals are governed (and constrained) by the web of conditions, individuals within the mega-group have particular capabilities for influence, indicated by the various identified techniques. Currently, those capabilities are being used to maintain the status quo in terms of the stagnant position of climate change education. Some individuals in these positions work in contexts that can foster those capabilities in others, which puts them in positions of even greater influence. Ada shared a way to think about responsibility by speaking about two layers of capability, or a context of capability:

> "One layer of capability in climate change is lowering your emissions, taking political actions and doing individual things. The second layer is that there's some institutions or individuals who can actually foster those capabilities in other people." (Ada)

When institutions or individuals who can foster capabilities in other people work together, the context of capability, and culpability, grows ever larger. Thus, individuals within the mega-group of stakeholders could arguably be construed as not only being complicit in maintaining climate change education's marginalised position, but also, as culpable for preventing climate change education from gaining a foothold.

Importantly, as mentioned at the outset, the purpose of this research is not to implicate individuals, but to deepen understanding of how it is that climate change education has come to be as it is. To this end, the following section unpacks a third condition, the fragmented policy landscape, and considers how that is interacting with discursive patternings to govern such education.

9.3.3 A policy landscape characterised by fragmentation and management

The third condition concerns interacting qualities of fragmentation and management across England's climate change education policy landscape. Working together, these qualities are reinforced by and reinforcing of divisions within the landscape and make it difficult for individuals to establish a footing for influence, particularly on matters that are counter to dominant discourses.

The fragmentation was evident in the form of numerous *disconnects*: between knowledge of climate change and educational responses to that knowledge; between international and national policies; between policies and position-holders; between government and non-government; and between timeframes and practices related to policy influence. There is also a fundamental lack of connection between education and climate change policies. Arguably, this disconnect is related to a mismatch between policy and politics that works in short term cycles, thus being ill-suited to long-term policy vision and solutions needed for climate change as well as the need for education policy to serve current generations and their lives as adults. Reconciling these mismatches into policy solutions would require the complex needs of education and climate change to be taken into account, which is arguably precluded by a fragmented system.

Sitting alongside this fragmentation are tendencies in both climate change and education towards recognised neoliberal traits of management (Hursh et al., 2015), through accounting measures that drive 'performativity' (Ball, 2013, p. 57). As discussed in Subsection 9.3.1, tendencies towards management and performativity have been evident in education policies in England since the *Education Reform Act 1988*. Under such conditions, what matters is accountability and excellence, performance measurement and management as well as the achievement of pre-determined ends (Ball, 2013). Meanwhile, in relation to climate change, tendencies towards management and institutionalisation of climate have been evident since the signing of the *UNFCCC* in 1992 irrespective of the inherent changeability of both the climate and the cultures that interpret it (Hulme, 2015). Thus, the policy landscape that is now governing climate change and education resembles what Ison and colleagues' (2018) refer to as 'systematic' modes of governance. That is, of:

> "linear, step-by-step thinking and action … linear causality, codified in hierarchical organisational structures with their routines and practices that embed managerial and 'engineering' type approaches." (2018, p. 1213)

Ison and colleagues identify various problems associated with such modes of governance, not least amongst which is their incompatibility with the sorts of systemic thinking that is required to address 'wicked problems' such as climate change and, as I will now describe, climate change education.

The fragmentation of the policy landscape, coupled with management characteristics, affects climate change education. The fragmentation is held in place by 'performativity' driving effort towards segregated policy objectives, which confines individuals and organisations towards accountability 'in their patch'. Schools are found driving towards assessment outcomes and approaches to climate change education that accord with management and accountability, more closely aligned with *Climate Change Education for Knowledge*. Meanwhile, non-curricular learning or other types of knowledge, as discussed in Chapter 4, are marginalised or overlooked. Approaches to climate change education that attend to student agency regarding climate change, or to supporting students in coping with the inherent uncertainty and complications of climate change (*Climate Change Education for Capabilities*), or to act as part of society's response to climate change (*Expansive Climate Change Education*) only exist at the margins or not at all. Rationalities of 'if you can't measure it, you can't manage it' have morphed into governmentalities of, 'if you can't measure it, it isn't worth having'. Climate change education, other than in a knowledge-based form, thus languishes in the policy landscape.

The coupling of fragmentation and management is also manifest in policies, and in stakeholders and position-holders managing their own patch, fulfilling their own objectives and striving to secure their place, rather than working to support a system or influence for a unifying purpose. To be 'successful' in this context of management and institutionalisation, requires achievement in line with established measurable standards that are rewarded within the status quo, to be predictable and "rule-following operatives" (Gewirtz et al., 2019, p. 17). The traits of deference and caution on the part of position-holders appear to be rewarded and thus, in not rocking the boat, these individuals maintain their positions and help to maintain the status quo. In Foucauldian terms, the position-holders could be construed as

"sustain(ing) the state more effectively than its own institutions, enlarging and maximising its effectiveness" (Foucault, 1980c, p. 73).

In contrast, despite evidence of 'stepping up' amongst position-holders and stakeholders outside the mega-group (i.e. schools and environmental education sector), there was limited evidence, prior to the parliamentary declarations of a 'climate emergency' in 2019, that efforts had been particularly influential. Whilst there are multiple factors contributing to this lack of influence, a Foucauldian lens orients the enquiry to consider the web of conditions. That is to say, for those occupying marginalised roles, their influence appears to be limited: their intentions do not correspond with the predominant neoliberal drivers nor are they endorsed by the leadership discourse. The upshot of any dissent from these individuals and organisations is likely to be exclusion, a deferential approach is unlikely to meet their ends and hence, their perspectives are unlikely to gain traction. Moreover, to influence climate change education policy from outside the ensemble of power, one would need to achieve the seemingly impossible task of establishing a footing in a fractured policy landscape. Climate change education thus appears to be in an unworkable position, whereby it not only needs an education overhaul (as discussed in Chapter 4), but also needs to be part of a system-wide, long-term policy response that is currently being precluded by the web.

Arguably, these three conditions – the neoliberal discursive patternings, an inconsistent leadership discourse, and the coupling of fragmentation and management - are resulting in the near omission of climate change education from England's policy landscape. By normalising certain connections and disconnections as well as governing what can be thought and said, the range of possibilities for what can be is reduced and climate change education is blinkered from view. In this context, the mega-group of stakeholders dominate what is 'sayable', those wanting or willing to participate fall into line, and perspectives that align with the market-driven status quo predominate. Dissenting voices find it difficult to gain purchase and aside from the recent spate of activism, exist at the margins of or outside the ensemble of power.

Thus, a Foucauldian lens has helped me to examine the position of climate change education within England's policy landscape and to make clear how this has come to be. It has enabled me to identify persistent challenges encountered in climate change education in England, and interpret them as governmentalities, that

is, I made visible mentalities, rationalities and accepted ways of doing and being. In so doing, this has facilitated understanding as to why climate change amelioration, the natural environment and in the context of this thesis, climate change education, have been repeatedly subordinated to other priorities. A climate change education that questions or is misaligned with the web of conditions, one that challenges the systems and norms associated with global economic growth, is unlikely to achieve traction in the current policy landscape. The position I arrive at concerning the governmentalities of climate change education is a relative one, whereby this interpretation is one of myriad possibilities for interpreting these perspectives. It is a unique perspective afforded by coupling a backwards-looking historical perspective, or policy historiography, with a critical analysis of the contemporary policy landscape, or policy archaeology. In so doing, I have highlighted problems, complications and difficult questions. In the words of Ferreira:

> "Such an analysis does not provide glossy or easy answers to problems but instead provides new, often troubling, insights that challenge us to think differently about problems." (Ferreira, 2009, p. 611)

Thus, having "unsettled that-which-is" (Ferreira, 2009, p. 618) it is now possible to decide whether to continue with those rationalities or change them. On the basis of the governmentalities, and in recognition of the need for change if the climate crisis is to be averted, the next section discusses possible avenues for taking climate change education forward in England.

9.4 Responding to governmentalities: three avenues for change

This section turns towards the future and thus, to addressing my final research question:

> RQ4: What insight does this research offer for the future of climate change education in England?

Building on the above discussion and the research literature, I consider three interrelated changes that I believe are necessary if a more meaningful educational response to climate change is to be achieved, and discuss them in relation to the governmentalities. Subsection 9.4.1 discusses reframing the purpose of education, Subsection 9.4.2 concerns rethinking institutions of governance, and Subsection

9.4.3 explores how position-holders might be supported in moving from 'standing back' to 'stepping up'. As I discuss, for any of these avenues to be options, they are dependent on each other. When considered as a whole, they indicate that major reform is needed in order for education to contribute meaningfully to society's response to climate change.

9.4.1 Reframing the purpose of education in the context of climate change

The first avenue for thinking about the future concerns reframing the purpose of education in the context of climate change. As discussed previously, the policy landscape in England is underpinned by aspirations for economic growth, and thus, climate change responses are economically construed, with the purpose of education being oriented towards participation in the workforce. I have argued that this orientation makes education unfit for purpose in a context of climate change and thus, joining a chorus of voices in the environmental education literature (Glackin & King, 2020; Jickling, 2017; Kopnina & Cherniak, 2016; Vare & Scott, 2007), I believe that the purpose and orientation of education needs revisiting. I echo Kopnina with Cherniak's (2016) call for an education that fosters democratic exchanges of ideas and advocates for more-than-human species. Moreover, in accordance with Kopnina (2020), education should be decoupled from the hegemony of economic growth to allow for its alignment with the natural environment and empowerment, inclusive of human and more-than-human rights. This position also chimes with the views of Sterling, who calls for a new purpose to be framed in terms of "our common humanity and commitment to a safer, kinder, and flourishing world and planet" (2017, p. 42). Stemming from absences that were identified through my analysis of policy texts and position-holders perspectives and in light of the crisis, I add to these voices, contending that a reframed purpose of education needs explicitly to: i) foreground the natural environment and care for all inhabitants of the planet; and ii) acknowledge climate change as a crisis that requires an urgent response from education. Arguably, such reframing could effectively upend the model of education that dominates in England today. It could also generate a conceptualisation of climate change education that positions action for climate change amelioration as the central aim, supported by agency and knowledge, rather than knowledge as the aim, with the hope that agency and action will ensue.

There are (at least) two key challenges here. The first, raised by Reid (2019b), is that orienting education towards a crisis can result in agreeing to a narrow purpose (e.g. behaviour change), rather than supporting a broad, transformational education agenda. The second is that such a purpose is discordant with the governmentalities of climate change and its enactment would need to subvert the status quo. Here, again, the work of Ison and colleagues is potentially helpful as they describe "purpose elaborating" (2018, p. 1213), whereby rather than emphasising predefined purposes or goals, these should be continually renegotiated and recalibrated within unfolding contexts. To explore the notion of 'purpose-elaborating' for education in the context of climate change, I turn to the nested conceptualisations of climate change education. That is, 'purpose elaborating' might involve thinking through the benefits and limitations of an education about climate change, that is, an achievement-oriented curriculum resembling *Climate Change Education for Knowledge.* It might mean to think through what education should look like in the context of climate change in a way that resembles *Climate Change Education for Capabilities*. It then might entail continuing to think through an education that is oriented towards active participation in society's response to climate change, that is, resembling *Expansive Climate Change Education*. The purpose of this ongoing conceptual thinking would not necessarily be to define or delineate what is in or out, but rather, to undertake a reflexive practice of 'purpose elaborating'. Guided by this heuristic, or its inversion, as proposed above, this would be a process of evaluation and envisioning of climate change education that leaves the enactment open to ongoing consideration amidst the evolving climate crisis and with respect to local contexts. A more reflexive purpose of education could potentially emerge, unshackled from the dominant economic drivers.

9.4.2 Rethinking approaches and modes of governance

The second avenue concerns how these sorts of discussions could be possible amidst the prevailing governmentalities: would it be possible to disassemble the ensemble of power and reinvent governing structures in forms that enable a new purpose to emerge, or accommodate 'purpose elaborating'? Here, Ison and colleagues' (2018) distinction between systematic approaches to modern government and systemic models is instructive. As discussed in Subsection 9.3.3 above, the contemporary climate change education policy landscape resembles Ison

and colleagues' characterisation of linear, managerial and historically organised ways of working, that is, of 'systematic' approaches to governance. However, a revisited purpose of education, such as that discussed above, calls for "systemic" (Ison et al., 2018, p. 1212) approaches to governing that support multiple, dynamic, intersecting relationships within and across a governing system, one that patently contrasts with systematic norms that dominate the policy landscape. Ison and colleagues argue that there is a need to move from institutionalised governance structures to innovative institutions, with coalitions that enable systemic governing practices and support alternative discourses.

Clearly, moving from systematic to systemic approaches of governance that could accommodate an open-endedness is not straightforward. As this research has found, position-holders' perspectives of climate change education were couched amongst various macro- (philosophical), meso- (policy, systems) and micro-level considerations (e.g. values). Arguably, the complex considerations sitting behind individuals' views, coupled with the governmentalities, offer insight into why climate change education is in the state it is. That is, agreeing to and enacting alternative versions of education in the context of climate change, particularly ones accommodating open-endedness and/or major paradigm shifts, would require long and considerate conversations the underpinning values and purpose of formal education and that unpack macro-, meso- and micro-level concerns; conversations that are arguably incompatible with the turbulent political environment of recent years. As Lawrence remarked:

> "So, conversations will cause change. The more conversations the better. The more that they are considered and not dominant conversations. Constructive, open, exploratory conversations with ideas would be the cognitive revolution that I would seek." (Lawrence)

Lawrence's call for 'constructive, open, exploratory conversations' chimes with Levinson's (2010) discussion of deliberative dialogue. That is, Levinson describes how this sort of dialogue and decision-making can occur in various institutional forms, incorporating specialists and lay people, thus enabling communication across policy and social differences. This could allow for engagement with emotion and the crisis, in a way that acknowledges human experience of climate change and accommodates open-endedness in terms of policy solutions. Resembling inclusive

democratic processes of 'purpose elaborating', such dialogue could theoretically facilitate conversations that bridge fragments of the policy landscape, thereby potentially preventing the unchallenged dominance of particular stakeholder groups or concerns. Furthermore, such approaches resonate with other thinking associated with aspects of climate change education, for instance, ideas concerning collaborative, creative and non-linear pedagogies, such as Jickling and colleagues' 'wild pedagogies' (Jickling et al., 2018), or enactments of learning, such as Facer's advocacy of "making strange of school spaces… to open it up as a site for politics, struggle, contestation" (2014, p. 124). Thus, in various ways, 'systemic' approaches to governance that mirror thinking related to climate change-related education pedagogy and enactment, seem well-suited to the needs of such education.

Yet, an engagement with emotions and human experience, coupled with open-endedness, are awkward considerations for policymaking processes beset by principles of, 'if you can't measure it, it isn't worth having' (discussed in Subsection 9.3.3 above). Moreover, returning to the governmentalities of climate change education, to what extent could it be possible to implement such open-ended and accommodating approaches when a web of conditions is always at work? Whilst deliberative spaces might be intended to be and appear democratic, innovative and inclusive, this is not necessarily the case. On the one hand, these spaces can accommodate too much balance and give voice to dangerous views. On the other, certain points of view, uncommon discourses and dissenting perspectives are likely to be disregarded owing to the web. Given the governmentalities of climate change education, how feasible is it for genuine alternatives to emerge? Once again, the theoretical resources of Foucault that view power as dispersed, could help. The dispersed nature of power means that there could be opportunities to intervene and therefore, it is worth trying to do so. Hence, I now turn towards thinking about how change could be envisaged amongst position-holders.

9.4.3 Position-holders: from 'standing back' to 'stepping up'

The third avenue for responding to governmentalities that I address focuses on the position-holders. I consider how they might be supported in moving from 'standing back' to 'stepping up' to influence. As previously discussed, although this research was not set out to critique individuals, having identified a disturbing lack of

influencing amongst individuals in positions of potential influence, I now propose some ways forward. Afterall, as Henderson and colleagues state:

> "Although we did not create the system that generates anthropogenic climate change, as citizens we have responsibility for changing it. Choosing to do nothing is not an adequate response." (2017, p. 415)

As discussed in Chapter 4, research participants were selected because they were perceived to be in positions that could influence policy. However, the analysis found limited evidence of climate change education policy 'influence' amongst the sample, nor did it give a strong sense of individuals framing themselves as having a 'stake' in doing so. Hence, I re-labelled them position-holders (Powell et al., 2017) in that the individuals were in positions where they had the capacity to influence climate change education policy. Also of note was the disconnect that I observed between the limited evidence of climate change policy influencing and individuals' recognition of the climate crisis. That is to say, most position-holders expressed concern about climate change and were inclined to think that more needed to be done, including in education. Position-holders also evaluated the system they worked within, reflected on the purpose of education, and several ruminated about their previous or potential roles in climate change education policy influence. That is to say, position-holders were reflexive as they discussed the system they worked within. This observed reflexivity is important for several reasons: first, if I had not asked the questions, these position-holders might not have had to consider them. This indicates an important contribution of this research, and all that is aimed at exploring pressing questions with position-holders, regarding its' facility to encourage individuals in positions of potential influence to act. As Faith remarked:

> "You've sparked me to think and now I'm going to … try again and do something more on that, but also … try to see maybe who in the Department for Education we could talk to." (Faith)

Second, the reflexivity is important in the way that it exposed differing emphases amongst position-holders more so than strongly dissenting views: this suggests the potential for negotiating change through considered conversations, as discussed above. Third, their reflections incorporated micro-level considerations that could lie outside of the ensemble of power and thus, help to disrupt it. Whilst position-holder

perspectives pointed to the discourses and governmentalities of climate change education, as described above, their perspectives were simultaneously intertwined with their own values.

Thus, one way to look at how to encourage position-holders to 'step up' to influence could be to consider individual values, particularly amongst those who are aligned with the ensemble of power. The capabilities approach could, again, provide useful theoretical framework to do so. At the heart of the capabilities approach is the view that freedom and justice are dependent upon people making choices that are based, upon reflection, on what they value (Robeyns, 2005). Their choices concern their 'beings' and 'doings', that is, what they are and what they do. In the language of the capabilities approach, 'capabilities' refer to the opportunities to achieve, whereas 'functionings' are beings and doings; people choose to achieve particular functionings based on what they value. Notably, the position-holders in this research were knowledgeable about the climate crisis and upon reflection, they 'valued' an educational response to climate change. In fact, 23 out of 24 position-holders took the view that education had an important role to play in society's climate change response. Furthermore, many were in positions where they might be able to act (or influence), because their alignment with the web of conditions meant they were powerfully positioned. Yet, in a context where the climate change education policy landscape in England is found wanting, it appears that most position-holders were not making choices to 'be' influential or to 'do' influence in relation to such education despite valuing it. The lack of influencing indicates that personal values in favour of climate change education are not enough to drive action or to overturn the constraints imposed by the web of conditions. With the support of the capabilities approach, further exploration of what position-holders value and how that translates into choices about 'being' and 'doing' appears as an opportunity for future research.

Turning to the student activists, they could also provide insight to support position-holders to 'step up' to influence. As previously explained, the sample did not include students, teachers or head teachers and the correspondence between their discourses and the governmentalities of climate change education is hence not examined here. However, observing and reflecting on the recent civil action, particularly student activists, suggests that students have chosen a route, whereby they can influence in ways that the position-holders have not chosen to do so. Furthermore, as discussed in Chapter 3, it appears that the wave of activism has

impacted on popular and political discourse on climate change in ways that have rarely been achieved (Copenhagen's COP 15 is a possible exception), despite a long history of advocacy, including from the environmental education sector, for societal change in response to the climate crisis. The efforts and responses to the recent activism signals the importance of the present for those who are working in the mega-group of stakeholders and with secure places in the ensemble of power, as well as those on the margins, to 'step up' to influence. It also indicates that a closer look at 'activism' could prove insightful in order to realise greater policy influence amongst position-holders. Accordingly, I turn to considering 'activism' in the final section of this chapter.

9.5 Nudging influence forward with 'activism'

Activism has been explored in several ways in the environmental education literature, for instance, in relation to youth or students as activists (O'Brien et al., 2018; O'Loughlin & Gillespie, 2012; Partridge, 2008), activism or political engagement in teaching and learning (Stitzlein, 2015; Van Poeck et al., 2019) and educators (Hunter & Jordan, 2020). Yet, the links between activism and policy influence amongst individuals situated in similar roles to this study's position-holders appear to be underexplored. Given the stark contrast between the lack of influencing identified in this research, and the recent civil action, these links seem worth investigating. My intention here is not to recast position-holders as banner-waving activists, but to consider how an activist lens might support rethinking about influence, such that the two working together could support the realisation of more targeted climate change education policy in England. Thus, the final section of this chapter explores affordances associated with viewing policy influence through an activism lens. Bearing in mind that the power of concepts can be diluted by incorporating them into dominant discourses (Van Poeck & Lysgaard, 2016), this discussion is proffered as a contribution towards nudging influence forward, rather than appropriating activism such that it fits within the deferential mainstream.

This discussion is presented in two parts: Subsection 9.5.1 discusses conceptual similarities between activism and influence, drawing primarily on Corning and Myers (2002); and Subsection 9.5.2 explores the affordances of 'dissent', informed by the work of O'Brien, Selboe and Hayward (2018) and El Khoury (2015), as a useful lens for dislodging the 'deference' that dominates

amongst position-holders. Both sections draw on contributions from the research literature to reflect on the research findings in view of the civil action that began in 2018 and was ongoing in 2020.

9.5.1 Similarities between activism and influence

Common conceptions of activism are associated with public demonstrations in the form of street marches or occupations, actions that made headlines during the 2018-20 climate protests (e.g. Glenza et al., 2019). Recent research into educators' environmental literacy (Hunter & Jordan, 2020) suggests that environmental educators' views of activism chime with this narrow definition, in ways that impede their behaviours. To explain, through interviews with 46 educators working in formal and informal settings in the United States, Hunter and Jordan found that "negative beliefs about politics and activists act as barriers to systemic behaviours" (2020, p. 8), that is, behaviours that engage with large scale, socio-political systems. Akin to the position-holders, who I found to be 'standing back' from influence, the educators in their study were 'standing back' from activism. The researchers identified three contributing factors: i) doubt in the political system; ii) inexperience and low confidence; and, of central concern for this discussion, iii) rejection of particular identities. That is to say, the educators' described themselves as 'not political' or 'not an activist' and they rejected the 'conflict-oriented' versions of activism that can be emphasised in public discourse. Hunter and Jordan's study, thus, highlights potential barriers created by perceptions of activists that are promulgated within public discourse and the media, that is, of activism associated with lawlessness or with youthful hot-headedness. However, academic descriptions of activism are conceptually broader and could offer alternative framings for it that the educators in Hunter and Jordan's study, as well as the policy-influencers in my research, could identify with.

Here, I turn to Corning and Myers, who have explored individuals' propensities to engage in social action to try to understand "how an activist identity develops" (2002, p. 703). Their analysis supports thinking about the correspondences between conceptualisations of activism and influence, behaviours of activists/influencers, and whether more influence could be fostered amongst position-holders. To begin, I draw upon Corning and Myers' definition of an activist orientation, as follows:

> "an individual's developed, relatively stable, yet changeable orientation to engage in various collective, social-political, problem-solving behaviours spanning a range from low-risk, passive, and institutionalized acts to high-risk, active, and unconventional behaviours." (2002, p. 704)

They describe activist behaviours as "various collective, social-political, problem-solving behaviours" (2002, p. 704) that occur along a spectrum. Notably, they describe these behaviours as including institutionally-based acts, a view that is mirrored elsewhere (e.g. Marquart-Pyatt, 2012). At one end of the spectrum are individuals "who engage infrequently in highly disruptive, high-cost behaviours" (2002, p. 704), that are often high-risk and unconventional. Some of the more headline-grabbing actions associated with the climate protests might fit here, for example, protestors gluing themselves to the Shell headquarters in London (McShane et al., 2019) or disrupting the London Underground (Cockroft & O'Reilly, 2019). At the other end of the activist behaviour spectrum are more passive 'institutionalized acts', carried out by the "highly committed individual who consistently engages in low-risk political behaviours" (Corning & Myers, 2002, p. 704). Arguably, the 'stepping up' position-holders from the environmental education sector could be envisaged here, based on their reports of committee participation, network development, and contributions to government consultations. The actions and behaviours of the teacher and student strikers might spread out along a continuum in between. What is important here is that these broad conceptions validate 'activism' as a reasonable frame to consider a range of activities conducted within institutional structures in which position-holders operate.

Having validated activism as a potential lens for thinking about influence, Corning and Myers' framing of activism also supports thinking about the sorts of behaviours that could be expected of position-holders who are stepping up to influence. Here, I return to the techniques and tools of influence identified in my analysis (Chapter 8), that is, those that position-holders described that they used to influence policy. Arguably, a correlation between activism and influence is observable in relation to the techniques of influence and the behaviours or actions of the civil activists: both groups rely on practical tools, evidence, political participation, connectedness and 'stepping up' on issues of choice. Corning and Myers' work theoretically justifies this observation. For instance, in relation to

connectedness, Corning and Myers emphasise the importance of ties and connections as part of activist orientations:

> "Interpersonal and organizational ties are critical to propelling activism… connections to and integration in activist networks are important… this relates to individuals' future engagement in activist behaviours." (Corning & Myers, 2002, p. 704)

Similarly, my analysis identified that 'connectedness' was an important element of influence for individuals and organisations. Related to connectedness and organisational ties, Corning and Myers also highlight the importance of "participation in accumulation activities" (2002, p. 705) (procuring resources, recruiting members and administering organisations) that are as crucial to activism as public protests. They argue that these activities, that rely on connections and ties, are as essential to activism as high-profile acts. Tracking across to my analysis, I found that practical tools were important for influencing, that is, convening meetings, organising conferences and, generally, having the capacity to pull people together. As Table 10 (below) indicates, there are several other correlations.

Table 10: Correlation between 'Techniques of Influence' and 'Activist Behaviours'

Techniques of Influence	**Activist Behaviours** (Corning & Myers, 2002)
Practical tools: convening meetings and conferences, disbursing funding, having financial resources	Accumulation activities, procuring resources, recruiting members, administering organisations
Evidence	A resource for activism (procuring resources)
Political Participation	Participating in networks; participating in a spectrum of institutionalised activities
Connectedness, including gravitas	Interpersonal and organisational ties Connections and integration in networks
'Stepping up'	Political action-taking as an "extension of institutional political behaviour" (p. 704)

Notably, my research has also identified the value of an organisation or individual's gravitas as part of influence, that is, as a valuable tool for using and creating those

connections around issues of choice. Hence, it can be seen that, despite differences in institutional contexts that are commonly associated with concepts of activism and influence, there are parallels between the behaviours, particularly if activist behaviours are to be understood along a spectrum.

The third insight arising from reflecting on Corning and Myers' (2002) work, concerns whether an activism lens could support more influence being fostered, even given the governmentalities of climate change education. These authors describe how people have dispositions or orientations towards political activism and that these are relatively stable. In view of the urgency associated with climate change response, such stability could be viewed as limiting the usefulness of activism as a frame to support increasing influence. However, Corning and Myers explain how these dispositions are changeable over time and that organisational and intrapersonal ties, that is, 'connectedness' is the crucial link. So, whilst the stability of dispositions could initially appear problematic, where these orientations are rooted in "the socialization experiences of individuals" (Corning & Myers, 2002, p. 705), there appears to be a window for intervention. Hence, if as Berryman and Sauvé argue, language, discourse and meaning evolve "quickly and democratically via participatory mediums" (2013, p. 142), then fostering a wider range of experiences could help. For instance, through the enactment of 'purpose elaborating' and democratic governance processes, as described above, position-holders could be provided with the 'socialization experiences' to support a pivot towards more influential tendencies. The different experiences could enable different perspectives to prevail, impacting, in the first instance, on local discourses and ultimately, on the wider discourse. On this basis, providing individuals with different experiences, be they position-holders or students, could support them in 'stepping up' to influence. Thus, in several ways, Corning and Myers work, when viewed alongside this research and the civil action, indicates the potential for further exploration of activism and influence.

9.5.2 Shifting from deference to dissent

The second part of this discussion of activism and influence responds to the overwhelming tendency towards deference and reluctance identified amongst my position-holders. Where, according to Jickling and Wals' (2008), obedience, deference and compliance are compatible with expectations for social reproduction,

the observed position-holders' tendencies are enabling the status quo to stay in place and to regenerate. Yet, and again turning to Jickling, "we cannot 'solve problems' by using the same thinking that created the 'problems' in the first place" (2016, p. 129). Hence, this section considers whether deeper understanding of 'dissent' could dislodge the deferential tendencies amongst individuals in positions of potential influence. Whilst elsewhere, Jickling (2017) has questioned whether dissensus will ever be enough for the sorts of transformations that are being sought in relation to how we live in the world, this section highlights how further consideration of dissent could reveal potential avenues for progress.

This discussion is grounded in O'Brien, Selboe and Hayward's (2018) analysis of the various ways that youth express political agency within and outside traditional political processes, specifically concentrating on dissent expressed through climate activism. O'Brien, Selboe and Hayward define dissent as:

> "a conscious expression of disagreement with a prevailing view, policy, practice, decision, institution, or assumption that something is exacerbating climate change." (2018, p. 2)

As described previously, many of the position-holders expressed *disagreement* with the prevailing norms relating to education and climate change. That is, in various ways and to varying degrees, they expressed disagreement with the current model of education and/or the current response to climate change, whilst also contending that there were human factors exacerbating the climate crisis. Thus, it appears broadly suitable to view position-holders perspectives in terms of dissent by drawing on O'Brien and colleagues' definition. O'Brien and colleagues also identify the importance of maturity to distinguish dissent from frustration, as follows:

> "the ability to express political dissent rather than simply frustration requires a mature level of social consciousness, moral reasoning, and insight into the situation that an individual or community is experiencing." (2018, p. 4)

Moreover, they identify dissent that occurs in democracies as expressed through political processes, including opposition politics and political activism, that is, through institutionalised processes, thereby according with the above discussion. Therefore, arguably, there are parallels between the attributes of dissent as described by O'Brien and colleagues, and the concerns of the position-holders and the

situations in which they worked. The position-holders' disagreement and concern, their social consciousness, moral reasoning and insight along with their institutional contexts could indicate their potential for influence in terms of dissent.

O'Brien and colleagues go on to set out a typology of dissent - 'dutiful', 'disruptive', and 'dangerous' – as reflected in youth activism. Table 11 (below) presents a summary of this typology, along with some adaptations, and correspondences arising from my research. A discussion then follows.

Table 11: Four types of dissent and the position-holders (adapted from O'Brien et al., 2018)[20]

Type of CC activism	Dutiful Dissent	Disruptive Dissent	Progressive (Dangerous) Dissent	Infrapolitical Dissent
Orientation to prevailing power relationships	Working within existing systems and power structures to effect policy change	Contests prevailing social norms and policy practices to redirect policy and change outcomes	Creates and (re-)generates new and alternative systems, subverting existing power structures by mobilizing citizens around new norms and values	Working covertly or informally to dilute the dominant ideology
Approach	Reformist	Oppositional	Propositional	Informal
Example of activism	Helping university to develop an ethical investment policy	Protesting outside a local bank to get them to divest from petroleum industries	Setting up an alternative local currency that does not rely on existing financial institutions	Lobbying in informal spaces; 'casual political talk'; public gestures, e.g. tying ribbons around trees; satire and gossip; political blogs
Strengths	Provides insights into how current institutions and systems function Offers direct access to those holding power Builds legitimacy and authority within existing system	Increases awareness and engagement; Highlights justice and equity dimensions; Focuses on underlying causes of climate change.	Demonstrates viability of alternatives Tends to be 'off the radar' from those threatened by alternatives	No need to explicitly challenge the norm whilst gradually, collectively, undermining;

[20] O'Brien and colleagues summary include Dutiful, Disruptive and Dangerous Dissent. I have made three adaptations: i) relabelled Dangerous as 'Progressive Dissent'; ii) added a column for 'Infrapolitical Dissent; and iii) added three rows: correlation with Corning and Myers, correlation with position-holders and relation to 'web of conditions'

Risks	Co-optation; enrolment in the reward system of current structures; danger of normalizing the status quo	Polarization; promotion of antagonisms rather than alternatives	Creation of 'parallel systems' that are progressive but do not challenge status quo or that risks being co-opted to reproduce business as usual	Uncoordinated, patchy efforts undermine and/or confuses potential effect; Requires energy input without evidence of achievement
Correlation with Corning & Myers	Low-risk, institutionalized acts, passive.	High(er) risk behaviours; disruptive; potentially high cost	NA	Can be low-risk as part of or alongside institutionalized acts
Correlation with position-holders	Identified amongst 'stepping up' position-holders influencing activities	Observed amongst student and teacher activists; Evident amongst position-holders perspectives, more so than their actions/behaviours	Reflected in perspectives of position-holders captured in *Expansive Climate Change Education*	Possibility for all position-holders to influence; Highlights importance of influence for those beyond mega-stakeholder
Relation to 'web of conditions'	Potential to be constrained based on the 'web of conditions'	Counter to/challenges the 'web of conditions'	Beyond/outside of the 'web of conditions'	Could serve to 'dissolve' the web of conditions

The first type is ‘dutiful dissent’, which involves “working within existing systems and power structures to effect policy change” (O’Brien et al., 2018, p. 38). Arguably, the position-holders could be envisaged here, particularly those in the mega-group of stakeholders, who have power or can access it by virtue of their connections and/or gravitas. However, given the web of conditions, relying on position-holders operating within a paradigm of dutiful dissent could find the status quo being held firmly in place. The second type is disruptive dissent, which involves “contesting prevailing social norms and policy practices to redirect policy and change outcomes” (O’Brien et al., 2018, p. 38). Arguably, the perspectives on climate change education shared by many position-holders could straddle dutiful and disruptive dissent, in that individuals’ were troubled by issues of justice and equity and contested the underlying causes and the governance systems, although there was limited evidence of related action. Whilst there was limited enactment of ‘disruptive’ dissent amongst position-holders, the observed behaviour of student protestors could be envisaged here. O’Brien and colleagues describe the third type of dissent as ‘dangerous dissent’, that is, that which “creates and (re-)generates new and alternative systems, subverting existing power structures by mobilizing citizens around new norms and values” (2018, p. 9). Whilst the intended outcome of ‘dangerous dissent’ appears to be aligned with *Expansive Climate Change Education*, I contend that the term could be more fruitfully captured as ‘progressive dissent’, rather than dangerous. Instead of associating the pursuit of significant change with narrow, negative and rejected activist identities – indeed, as ‘dangerous’ - ‘progressive dissent’ would more accurately and positively capture the essence of this conceptualisation.

A fourth type of dissent is ‘infrapolitical’ dissent. Despite O’Brien and colleagues discussing infrapolitical or ‘off the radar’ dissent, they do not include it in their typology of youth dissent. Arguably, however, it has pertinence for thinking about affordances of an activism lens for policy influence, not least because they describe ‘off the radar’ dissent as having the potential to undermine the status quo, thereby subverting the web of conditions. Hence, I have added it to the typology in Table 11 above. O’Brien and colleagues describe ‘infrapolitics’ (drawing on the work of James C. Scott [1990]) as a way of expressing dissent through hidden, behind-the-scenes actions, that do not openly confront power. El Khoury (2015) describes infrapolitical activism as contrasting with visible, codified conventions

that govern political action, which, in Foucauldian terms, would be the accepted rationalities that govern thought and action. Accordingly, infrapolitical actions can be excluded from public discourse. Whilst these actions are not necessarily duplicitous, they can be covert, understated or informal and they are often discreet. They encompass a wider range of activities, which could be the arts or media, satire or gossip, or activities, such as blogging, that might contrast with public-facing conforming behaviours or personas. They are also conceivable as the deliberative practices, or 'casual political talk' (Levinson, 2010) discussed above. El Khoury argues that they can "dilute the reach of the dominant ideology" (2015, p. 108) without directly or openly challenging it. Given that infrapolitical practices are "excluded, ignored and/or marginalized" (2015, p. 105) by the 'public transcript', that is, by the governmentalities, such activities can be carried out 'under the radar', and enable alternative ideas, those that are marginalised or excluded from the mainstream discourse, to 'incubate' (El Khoury, 2015, p. 106). Thus, the everyday and informal order can be a powerful force for change, as follows:

> "Infrapolitical activities are often the unsung tide of actions that enable, and are the underpinnings of, a visible, public transcript-registering breakthrough." (El Khoury, 2015, p. 105)

As such, it seems that infrapolitical dissent could contribute to a breakthrough in the public discourse. In the case of this research and counter to a possible perception that stakeholders sitting outside of the mega-group, such as environmental education sector, are less powerful, an understanding of infrapolitical dissent thus amplifies the significance of actions taken by these groups. Moreover, it highlights the influencing potential of informal actions undertaken by those individuals who operate from within the ensemble of power.

Before closing this discussion, I make two final points about dissent that draw attention to some further complexities. The first concerns O'Brien and colleagues' assertion that dissent requires courage, a view echoed by several participants, for example:

> "It's people like yourself in the future who have got to be banging those drums. And frankly, to have the courage to do it." (Richard)

However, this research has also shown that dissent requires more than simply courage. It requires working outside of the web of conditions and thus, it embodies a challenge to the status quo. In so doing, individuals are likely to encounter inertia, at best, or criticism, scrutiny and professional risks to themselves or their organisations. It is understandable, therefore, that position-holders would feel in a bind about influencing for climate change education, if it is not their job, or they would consider it to be more than their job is worth to dissent.

The second point is that choosing to dissent, be that in dutiful, disruptive progressive or infrapolitical ways, also introduces complex questions about equity amongst current generations. That is, it raises questions that highlight tensions between the position-holders and student activists in relation to what each has to lose in the present and in the future. Keeping with the present, I first reflect on the position-holders. Individuals and organisations in positions of influence are able to maintain their current needs (maintain their own employment and fulfil organisation or policy objectives) and their position of influence, by acting in a deferential and cautious manner, in alignment with their organisations' values and working as part of the ensemble of power. In contrast, the student activists are working as individuals who, *in the present*, have not so much to lose in that they are not yet in positions of power and are positioned largely outside of the ensemble. Whilst students are able to enact dissent regarding 'the cause', rather than in relation to their organisation they are arguably in a position where they are better able to dissent than the position-holders, and that which they have shown appears to have had influence. Thus, there are complex factors to be explored in order to understand why individuals choose to dissent, or not.

In sum, the discussion in this final section points to several possibilities for thinking about dissent in relation policy influence. It highlights possibilities for: i) position-holders to dissent dutifully; ii) policy change to be precipitated through or with the support of, disruptive dissent; iii) the opportunity for progressive dissent arising from the recent disruption; and iv) the legitimate effects that 'infrapolitical' dissent and local, informal and everyday actions have in dissolving dominant discourses. This discussion points to the value and necessity of creating experiences and conversations at all levels of influence, if more climate change education policy influence is to be realised. Where, as Hulme argues, discourses dissolve as culture changes and as "new ideas, ideologies and powers emerge" (2008, p. 13), there

appear to be multiple possibilities and affordances for bringing an activism lens to influence such that more can be exerted in relation to climate change education policy. Recognising this overlap and laying these theorisations one of the top of the other given the governmentalities, takes thinking (and practice) about climate change education policy influence one step further. It also highlights that, both practically and theoretically, the multiple parallels between activism and influence would benefit from further exploration.

9.6 Thesis implications and opportunities for further research

The research has found England's contemporary climate change education policy landscape to be wanting. It has exposed just how little attention is being paid to climate change education in England, in policy texts, by position-holders and by key stakeholders. Documenting this troubling shortfall is, thus, an important contribution of this thesis that justifies the recent pleas of civil activists, who have been calling for 'more!' climate change education, and it adds finer grained insight into the scale of the problem. In so doing, the research has also illuminated a range of factors that are contributing to the lack of attention, that is to say, it has provided fresh insight into *how* this situation has come to be. It has shown that the complex content, enactments and spaces of learning associated with a meaningful educational response to climate change are discordant with the linear structures driven by measures of accountability that dominate mainstream education. It has shown that fragmentation in the policy landscape segregates 'what counts' as climate change education into contained parcels of disciplinary knowledge that are largely detached from the natural environment, let alone advocating for it. This overlooks the magnitude of the climate crisis, its causes and the urgent need for society to act, if it is to avoid a major disaster for generations to come. The research has also shown that the governmentalities of the climate change education policy landscape are oriented towards the all-pervasive drive for economic growth, and that what is sayable about climate change education is on those terms. To say or do differently requires the web of conditions that govern the policy landscape to be disrupted. That is, if today's students are to be equipped to live in a context of climate change, and to support society's efforts to ameliorate it, change is needed. Accordingly, I have argued that culpability for the lack of attention and responsibility for creating change lies with the mega-group of stakeholders. Moreover, inspired by the civil action, I

have proposed that bringing an activism lens to influence could support more position-holders, not only those who are aligned with the web of conditions, to 'step-up' and influence, thereby acting as catalysts to progress.

The momentum generated by the activists over the past two years, and the narrow window that has opened to reshape social institutions, including education, in particular as a result of the disruption caused by COVID-19 pandemic, makes this a crucial moment for acting on the research findings in ways that contribute meaningfully to society's response to climate change. Numerous opportunities for further research arise from this thesis, five of which I consider to be of particular importance.

The first concerns the views of individuals who enact policies, that is, the head teachers and teachers, environmental educators as well as students, on the role of education in the context of climate change. Further exploration of the correlations between these individuals' views and those of the position-holders captured in the nested conceptualisations, and the literature would provide valuable insight. Moreover, bringing practitioner and student views into policy research is important, if policy research is to play a genuine role in policymaking processes, and in systemic approaches to governing that I have advocated. That said, whilst recognising the pressures already experienced by individuals operating within the performance-oriented education system, doing so would require careful consideration of how to make their engagement in research and policymaking meaningful and worthwhile for all. Moreover, this needs to be approached in a way that recognises the skills, efficacy and confidence needed to build cultures of engagement.

Second, multiple opportunities for comparative study stem from this research. There are clear avenues for comparison between different countries of the devolved nations of the UK, particularly considering Scotland's policy commitment to Learning for Sustainability. Other insightful comparisons could concentrate on: different political contexts, such as between political cultures that are more collaborative (resembling 'systemic' modes of governance) in comparison with those that are more adversarial (resembling 'systematic' modes); and different climatic, geographic, urban/rural and historical contexts, to consider the myriad factors that affect culturally embedded perspectives (Hulme, 2015) and enactments of climate change education. Such comparisons could explore whether there are

contexts in which versions of education that resemble a meaningful and expansive climate change education are already being enacted or are likely to emerge.

A third avenue for future research concerns the micro-level factors that influence perspectives. As this study found, position-holders bring macro-, meso-, and micro-level factors (e.g. values) to their views on climate change education, whilst they also bring their own intersecting qualities (e.g. gender, ethnicity, age, climatic region, rural/urban context). Understanding the micro-factors that affect the perspectives of individuals from across the whole climate change education policy process could shed further light on how change might be realised in terms of policy influence and enactment. For this purpose, the capabilities approach could offer a theoretical lens for exploring what people value, the choices they make, and how those choices are enlarged or constrained by a range of factors ('conversion factors' in capabilities language), such as current professional or political contexts, higher education qualifications, or other personal qualities/characteristics.

A fourth avenue for further research, prompted by *Climate Change Education for Capabilities*, relates to further theoretical development and subsequent empirical work to explore climate change education through the capabilities approach. This would build on Kronlid and Lotz-Sisitka's (2014) exploration of climate change education as a 'conversion factor' that facilitates transformative learning, the sort of learning that they contend is needed for society to transform in the context of climate change. There are opportunities for further exploration of a meaningful educational response to climate change, in terms of capabilities, functionings as well as enabling and constraining conversion factors. Bringing together the nested conceptualisations of this research with the theoretical lens of the capabilities approach, could support development of a research informed, justice-based tool to support the design and evaluation of a climate change education policy. It could enable the complexity and 'messiness' of climate change to be shaped into a format that would allow for it to be operationalised in the education policymaking and enactment contexts.

A fifth and final opportunity, concerns the potential for further exploration of activism and influence to generate deeper understanding of their overlaps, which bring more policy influence to bear and fast. Given the multiple parallels between the notions, and that activists have recently made inroads, further exploration – both empirical and theoretical – could prove fruitful. On the enactment front, there are

opportunities for exploring how programmes can support different elements of activism and for considering content and outcomes that might be desired or expected from such programmes. On the policy influence front, there are opportunities for exploring what might prompt (or prevent) potential policy influencers from 'stepping up' and for developing interventions to support them to do so. I hope to continue with several of these lines of work in the future.

9.7 Closing remarks

Education, like all social institutions, has a responsibility regarding society's response to climate change. There is an urgent need for attention to be paid to its role generally, and formal schooling, specifically, in that response. So, what might it take for attention of those in positions of influence, and the policy landscape writ large, to be redirected towards a focus on climate change education? Whilst the failure to do so thus far stems, in part and in a Foucauldian sense, from systemic failures, individuals do have agency to turn their attention to the problem and to act. From their positions of influence, individuals are responsible for influencing the ensemble of power and for shifting the discourse. Looping back to where I began my history of the present, if Earthrise, Rachel Carson's *Silent Spring* and fears of the Cold War indeed contributed to the rise of 'climate as catastrophe' discourse, how might recent shifts in public and political engagement in climate change education alongside the recognition of systemic racial discrimination, Brexit, and COVID-19 affect future discourses and policy responses? If, as Hulme argues, discourses 'dissolve' as others come into play, in what ways might trends towards nationalism affect discourses on globalism, might fear of unseeable viruses affect how science is understood and acted upon in public and political domains, and might 'activism' affect 'policy influence'? This research comes at a time of unrest that must be harnessed to make this a time of transformation. It is incumbent upon those of us who are informed and who hold positions of influence to act.

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Appendices

Appendix 1 Political events and climate change civil activism for the period coinciding with this research (inexhaustive list)

Date	Brexit[21] and related politics events & COVID-19	Climate Change Activism	Interviews
2016			
June	23rd: UK referendum on Brexit with leave winning by a small margin "Should the United Kingdom remain a member of the European Union or leave the European Union?" 24th: Result of the referendum announced: Remain: 16,141,241 (48.1%) Leave: 17,410,742 (51.9%). David Cameron announces intention to resign.		
July	13th: Theresa May becomes Prime Minister		
2017			
March	29th: PM triggered Article 50 which began the two-year countdown to existing the EU (setting Brexit date as 29 March 2019)		
June	8th: UK General Election; Hung Parliament with no overall majority. Conservative Party won largest number of seats (317, 42.3% of vote; Labour 262 seats; SNP 35 seats; Lib Dem 12)		
2018			
June	26th: EU (Withdrawal) Act becomes law: the first 'Meaningful Vote'		
August		20th: Greta Thunberg begins her "*Skolstrejk för klimatet*" school strike for climate in Sweden, and coins the hashtag FridaysForFuture	
Sept		8th: Student strike in Stockholm; Thunberg spoke	

[21] Source: House of Commons Library Brexit timeline (Walker, 2020)

Oct		31st: Declaration of Rebellion, XR, Parliament Square London	
Nov	14th: The Withdrawal Agreement is agreed and published 25th: EU27 Leaders endorse Withdrawal Agreement at a special meeting of the European Council	28h: Australian students go on strike for the first time. Prime Minister Morrison urges students to be "less activist"; Resources minister that students should learn about mining and science	5th: Int. 1 (Nichola) 14th: Int. 2 (Rex) 20th: Int. 3 (Ellen) 22nd: Int. 4 (Alistair) 30th: Int. 5 (Anthony)
Dec	4th: Five days of Brexit debates begin, leading up to 'Meaningful Vote' on 11 December 10th: Prime Minister pulls the scheduled 'Meaningful Vote' on her Brexit deal (due 11 December). 11th: Prime Minister Theresa May wins vote of confidence in her leadership of the Conservative Party	4th: reports that strikes had spread to 270 towns and cities around the world, and 20,000 students: (Carrington, 2018) Thunberg speaks at COP 24 in Katowice, Poland (3 – 14 December) 11th: Mayor of London declares climate emergency (Taylor, 2018)	3rd: Int. 6 (Molly) 6th: Int. 7 (Hugh) 10th: Int. 8 (Christian) 11th: Int. 9 (Ada) 12th: Int. 10 (Sylvana)
2019			
January	8th: PM loses a vote in parliament (303 to 296). MPs approve an amendment that limits the governments' financial powers in the event of a no-deal Brexit 9th: Speaker of House of Commons allows a vote on: "that if the government loses the 'meaningful vote' on Jan 15, the Prime Minister will have to present a new 'plan B' Brexit within three days. 9th: 5 Days of Brexit debate begins, leading to a 'Meaningful Vote' on 15 January. 15th: PM loses the 'Meaningful Vote' 202 vote in favour of PMs Brexit deal, and 432 against 15th: Leader of opposition tables a motion of no confidence the Government. 16th: PM wins a vote of confidence in the Government (325 votes to 306) 21st: PM May presents 'Plan B'	25th : Thunberg delivers speech at the World Economic Forum in Davos entitled "Our House is in Fire" (Thunberg, 2019b)	10th: Int. 11 (Faith) 15th: Int. 12 (Theo) 17th: Int. 13 (Lawrence) 22nd: Int. 14 (Lori) 23rd: Int. 15 (Edmond) 31st: Int. 16 (Xavier)

	29th: 'Plan B' approved with two amendments		
Feb	14th: Government's Brexit plan is defeated in House of Commons	15th: Youth strikes for climate in UK. 10,000 students (according to organizers) 60 towns. This was the first coordinated nationwide walkout. (Taylor et al., 2019) 22nd : teachers for climate action hold protest outside DFE (Watts, 2020)	4th: Int. 17 (Callie) 5th: Int. 18 (Ewan) 11th: Int. 19 (Jon) 15th: Int. 21 (Josephine) & 22 (Alannah) 19th: Int. 22 (Samuel, via email)
March	12th: 'Meaningful Vote 2" with 242 voting in favour of PMs Brexit deal and 391 against. 13th: MPs vote to rule out a 'no deal Brexit', defeat for the PM. (321 to 278) 14th: 6 votes in House of Commons on amendments. Only one passed: that government should seek permission to extend article 50 and agree to a later date (413 to 202) 21st: EU27 grant extension on Brexit with two possible dates: 22 May (if Withdrawal Agreement agreed), 12 April if Withdrawal Agreement not approved by House of Commons. 27th: Commons debates and votes on eight indicative options. All options defeated. Two closest were: "confirmatory vote" (295 against, 268 for), "custom union (271 against, 265 for); 27th: PM May indicates that she would stand down before the second stage of Brexit negotiations 29th: Original date for UK to exit the EU. 29th: PM loses 'Meaningful Vote 3'	15th: 1.4 million people around the world, 2,233 cities and towns in 128 countries (Carrington, 2019a)	12th: Int. 23 (Ambrosia) 25th: Int. 24 (Alona)
April	1st: Indicative votes on four options. All are defeated ("customs union" only narrowly 276 to 273). 2nd: PM announces intention to seek second extension of Article 50 (until 31 October, 2019) 3rd: Series of Brexit votes	12th: School strike 16th: National Education Union voted to "stand in full solidarity with students participating in global protests and called for a "just transition" (National Education Union, 2019) 16 – 25th: Extinction Rebellion occupied key points in central	

	5th: May writes to European Council to seek another extension until 30 June 9th: MPs debate this request for extension. Passes by 420 to 110 10th: European Council met; UK and EU27 agreed to extension until 31 October 2019	London (Parliament Square, Marble Arch, Oxford Circus, Waterloo Bridge, Piccadilly Circus) 23rd: Greta Thunberg delivers "Can you Hear Me?" speech in the UK Parliament (Thunberg, 2019a) stating that the UK has a "mind-blowing historical debt" 24th: UK Student Climate Network, Scottish Youth Climate Strike in Parliament with Greta Thunberg and political party leaders – cross-party talks. No Theresa May. 28th: Nicola Sturgeon declares 'climate emergency' at Scottish National Party conference in Scotland ("Nicola Sturgeon declares 'climate emergency' at SNP conference," 2019) 29th: Welsh government declares a climate emergency (Mabey, 2020)
May	3rd: In local council elections, Conservatives lose over 1000 councillors, and lose control of several councils. Lib Dems are up by 705 and Green increase tally by 194. Independents also gain 550 council seats. 16th: Theresa May agrees to set a timetable for her departure as PM 17th: Opposition calls off cross-party Brexit talks after six weeks 21st: PM outlines new Brexit deal 23rd: UK votes in European Parliamentary Elections	1st: UK Parliament approved a motion by Labour to declare a climate and environment emergency (UK Parliament, 2019) 23rd: Labour Party (opposition) pledges to put the global climate emergency as a core element of the school curriculum (Weale, 2020) 24th: UK student strike listing 108 locations in UK (UK Student Climate Network, 2020)
June	7th: Theresa May resigns as PM, continues in post until new PM appointed	21st: UK student strike
July	24th: Boris Johnson becomes PM	10th: Committee on Climate Change releases 2019 Progress Report to Parliament (2019) 15th: Extinction Rebellion's Summer Uprising begins 19th: Student strike
Sept	4th: Commons pass Hilary Benn's EU Withdrawal Bill PM moves motion to hold early General Election (defeated) 9th: Benn Bill becomes law and parliament prorogues	20th: Global Climate Strike

	24th: Supreme Court passes unanimous judgment that decision to Prorogue Parliament was unlawful	
Oct	3rd: PM delivers statement to Commons outlining the govts proposals for a new Brexit deal 8th: Govt publishes the No-Deal Readiness Report 19th: Parliament sits on a Saturday: PM presents new deal; defeated when Letwin amendment is passed; PM later writes to Donald Tusk to ask for Brexit extension 21st: EU Withdrawal Agreement Bill is introduced to parliament 28th: Passes second reading; but timetable is defeated; PM pauses legislation. 28th: Third Brexit extension granted by EU ambassadors (until 31 January 2020) 30th: Govt introduces early Parliamentary General Election Bill – setting out date for General Election on 12 December 31st: Intended Brexit day (extension)	7th: Extinction Rebellion – International Rebellion begins. Some sites lasted for a few days, others more quickly. Uprising finished with an injunction by MET Police that protestors were acting unlawfully. The high court later (Nov 6) found that they were legally allowed to protest peacefully (Dodd & Taylor, 2019)
	12th: UK Election – Johnson as PM 12-13th: EU Council meeting day	
2020		
Jan	5th: Lab in Shanghai detects coronavirus COVID-19 (Johns Hopkins University & Medicine, 2020) 31st: First two cases of COVID-19 reported in UK (Public Health England and NHSX, 2020) 31st: UK leaves the EU. This marked the beginning of a transition year.	Greenpeace, Extinction Rebellion and other activist groups listed alongside terrorist organisations in guidance document distributed to counter-terrorism police across London as part of training for the Prevent strategy (Dodd & Grierson, 2020)
March	5th: first coronavirus death confirmed in the UK 10th: Government recommends workers at home; social distancing 16th: UK death toll reaches 55; confirmed cases over 1500 number of confirmed 20th March: EU chief Brexit negotiator reported to have corona	

	virus 26th: strict ‘stay at home’ rules “the Lockdown Regulations” (The Health Protection (Coronavirus, Restrictions) (England) Regulations 2020, 2020) come into force for the UK(and are gradually eased from May onwards) 27th: Boris Johnson announces he has contracted corona virus

Appendix 2 Policy sample: expressed intention in relation to climate change education

Org.	Policy	Year	Policy objective and expressed intention in relation to climate change education
International			
UN	UNFCCC	1992	A convention setting out the principles and commitments "to achieve … stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." (Article 2). The Convention describes commitments of Parties relative to 'Education, Training and Public Awareness' (Article 6).
UN	Doha Work Programme on Article 6 of the Convention (ACE)	2012	A Work Programme that "sets out the scope of, and provides the basis for action on, activities related to Article 6 of the Convention" (Section B.12). Its objectives link directly to climate change-related education.
UN	Paris Agreement to the UNFCCC	2015	An Agreement to 'enhance' the UNFCCC, including to "pursue efforts to limit the temperature increase to 1.5 degrees C above pre-industrial levels", increase adaptive capacity, make "finance flow" to support "low greenhouse gas emissions and climate-resilient development". The Agreement "affirms the importance of education, training, public awareness, public participation, public access to information and cooperation at all levels" (Preamble 13), includes a direct education provision "to enhance climate change education, training, public awareness, public participation and public access to information" (Article 12) and an indirect provision focusing on capacity building (Article 11)
UN	Transforming our World: The 2030 Agenda for Sustainable Development	2015	An Agenda setting out "a plan of action for people, planet and prosperity" oriented towards 'sustainable development' with poverty eradication at the core. There are 17 Goals and 169 targets. The Two Goals directly related to the research are Goal 4: "Quality Education: Ensure inclusive and equitable quality education promote lifelong learning opportunities for all; and Goal 13: "Taking urgent action to combat climate change and its impacts". Target 13.3 directly relates to climate change education "Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning."
National			

UK Gov	Climate Change Act	2008	An Act to set a 2050 greenhouse gas emissions target and establish various mechanisms in support of that target, including "encouraging activities that reduce such emissions or remove greenhouse gas from the atmosphere" and "make a provision about adaptation to climate change". No intention is expressed in relation to climate change education.
BEIS	Industrial Strategy	2017	A Strategy "to boost the productivity and earning power of people throughout the UK", to create a "Britain fit for the future". Its key policies are organised under five foundations: i) Ideas, ii) People, iii) Infrastructure, iv) Business Environment, v) Places; and respond to four Grand Challenges: i) AI & Data Economy, ii) Clean Growth, iii) Future of Mobility, iv) Ageing Society. The strategy expresses intentions in relation to climate change (principally clean growth) and education, but no intention is expressed in relation to climate change education.
BEIS	Clean Growth Strategy	2017 (amended 2018)	A Strategy setting out "a comprehensive set of policies and proposals to accelerate the pace of 'clean growth', i.e. deliver increased economic growth and decreased emissions." (p 10). No intention is expressed in relation to climate change education, however, the strategy expresses intention relative to education (training) for clean growth, and Green Great Britain week to "engage as many people as possible in the importance of tackling climate change and improving air quality" (p 59)
DEFRA	National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting	2018	A Programme setting out the government's adaptation priorities and specific and measurable objectives in response to the second Climate Change Risk Assessment of the Committee on Climate Change Adaptation Sub-Committee. No intention is expressed in relation to climate change education, however intention is expressed in relation to: i) schools in terms of over-heating and flooding; ii) general awareness raising and engagement related to climate science; iii) engaging young people with the natural world through the 25-Year Plan, Green Great Britain Week and the Year of Green Action (2019).
DEFRA	A Green Future: Our 25 Year Plan to Improve the Environment	2018	A Plan setting out the government's "comprehensive and long-term approach to protecting and enhancing (natural landscapes and habitats) in England". No intention is expressed in relation to climate change education. However, there are intentions expressed to connect people, (esp. children) to nature in and out of school (Section 2), to tackle climate change as a global leader, and to "drive progress on certain SDGs where domestic consumption has an impact on other countries" (p 117).
UK Gov	Environment Bill	2020	A proposed Bill to "make provision about targets, plans and policies for improving the natural environment",

(DEFRA)	Policy Statement		environmental protection and connected purposes matters. The policy statement describes the Bill's intention to "put the environment at the centre of policy making... to make sure that we have a cleaner, greener and more resilient country for the next generation." It connects to the 25-Year Plan. The statement expresses direct intention relative to climate change, but no intention is expressed in relation to education.
UK Gov (Office for Students)	Higher Education & Research Act	2017	An Act that "makes provision about higher education and research" and sets out arrangements for assessing quality in UK Higher Education. No intention is expressed in relation to climate change education. It expresses intention in relation to the contribution of education to the economy, employment and the higher education market.
DfE	Teachers' Standards	2011 (updated 2013)	A policy to "define the minimum level of practice expected of trainees and teachers form the point of being awarded qualified teacher status" and to share guidelines for assessment of the standards. No intention is expressed in relation to climate change education. There are expressed intentions in relation to Fundamental British Values (as defined in the government's counterterrorism Prevent Strategy (Secretary of State for the Home Department, 2011)
Higher Education Funding Council for England/ DfE	Teaching Excellence and Student Outcomes Framework Specification	2017	A Framework to "recognise and reward excellent teaching in UK higher education (HE) providers". The document describes the assessment framework. No intention is expressed in relation to climate change education. The document expresses intention in relation to quality positioning the student as a customer of higher education.
REF Steering Group	Research Excellence Framework	2019	A Framework to provide accountability for investment in research, benchmarks for the HE sector, and inform research funding allocation. The document sets out assessment criteria and processes for REF 2021. There is no expressed intention in relation to climate change education. Climate change is mentioned as an area of policy impact and a topic of research in four Units of Assessment, although not in Education.
UK Gov (DfE)	Education Act	2011	An Act to "make provisions about education, childcare, apprenticeships and training", schools and school workforce, and several other "connected purposes". No intention is expressed in relation to climate change (or related matters), or climate change education. Connected statutory guidance includes related matters, e.g. sustainable travel as benefiting air pollution and congestion, and physical wellbeing (DfE, 2014c) ; and

			understanding the environment in early years education (DfE, 2017a)
Ofsted	Education Inspection Framework	2019	A Framework to "bring about improvement in education provision" (p. 4), that is, that schools "improve, are user-focussed, are efficient and effective in use of resources" (p. 4). The document sets out how the inspection is carried out. There is no expressed intention relative to climate change education. It expresses intentions in relation to quality of education, and personal development (with reference to Fundamental British Values, i.e. Prevent Strategy), and education oriented towards the next stage of education or employment.
Ofsted	School Inspection Handbook	2019	A Handbook to "describe the main activities carried out during inspections" that take place under the Education Inspection Framework, including the evaluation criteria. It makes a judgement on the 'quality of education' that schools provide to pupils. Curriculum is central to this. No intention is expressed in relation to climate change education. Uses of 'sustainability' and 'environment' do not refer to the natural environment.
DfE/Education and Skills Funding Agency	Area guidelines for mainstream schools (Building Bulletin 103)	2014	A policy providing non-statutory guidelines for school buildings and sites to architects, sponsors and those involved in school building projects. No intention is expressed in relation to climate change education, nor to the role of school building projects in relation to climate change mitigation or adaptation.
Education and Skills Funding Agency	Guidelines on ventilation, thermal comfort and indoor air quality in schools (Building Bulletin 101)	2018	A policy document setting out "regulations, standards and guidance on ventilation, thermal comfort and indoor air quality for school buildings" (p. 3) for those involved in school building design, specification or construction of new schools or refurbishments. The guidelines are intended to "improve school buildings and lead to healthier outcomes for students" (p. 3). No intention is expressed in relation to climate change education. Section 4.1.5 "Climate change adaptation" notes the importance of "future proofing" the indoor teaching environment (p. 61). Annex C notes that "significant effort is currently being put into designing sustainable school buildings." (p. 150)
DfE	Top Tips for Sustainability in Schools	2012	A document setting out practical 'tips' for schools to be more sustainable and to save money "should they choose to" (p. 1). No intention is expressed in relation to climate change education. Some 'tips' could relate to climate change mitigation and adaptation. Climate change is referred to as something students "hold strong concerns about" and can act upon.
Curriculum			

DfE	The national curriculum in England: Framework document (Key Stage 1-4, excluding Geography and Science)	2013	A framework setting out contextual information about the curriculum, aims, requirements and programmes of study. It features "the best that has been thought and said" (p. 4) organised into: English, Mathematics, Science, Art and Design, Citizenship, Computing, Design and Technology, Geography, History, Languages, Music, PE. Aside from references in Geography and Science (reviewed separately) no intention is expressed in relation to climate change or climate change education. It is possible for teachers to consider climate change as context in some subjects but there is no directive to do so.
DfE	Geography KS1-3	2014	This is mandatory curriculum. There is no direct mention of 'climate change'. There is reference to climate, to changes and to weather, e.g. "including the change in climate from the Ice Age to the present" (KS3) and "understand how human and physical processes interact to influence, and change landscapes, environments and the climate" (KS3). There are other opportunities for 'climate change education'. There is no advocacy 'for' the environment.
	Geography GCSE		The subject content setting out "the knowledge, understanding and skills common to all GCSE specifications in Geography" (p 4). This is non-mandatory curriculum. There are no direct mentions of 'climate change'. There are multiple opportunities for climate change education across the subject content.
	Geography GCE AS and A Level		A document setting out the "knowledge, understanding and skills common to all AS and level specifications in Geography" (p 3). There is an explicit reference to climate change "Landscape Systems: How landforms and landscapes evolve as result of processes driven by past, present and future climate changes" (p 8). There are other opportunities for climate change education across the subject content.
DfE	Science KS 1-4	2014	This is mandatory curriculum. There is one direct mention of 'climate change': KS 4 Chemistry: "evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change" (p 221). There are two near-mentions: KS3 Chemistry: "the production of carbon dioxide by human activity and the impact on climate" (p 207); and KS4 Chemistry: "potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate" (p 221). There are multiple other opportunities across the curriculum.
	Science GCSE		This is subject content for awarding organisations to base examinations specifications on. There is a direct

	Combined and Single Science [22]		reference to climate change in Chemistry: "evaluate the evidence for additional anthropogenic causes of climate change, including the correlation between change in atmospheric carbon dioxide concentration and the consumption of fossil fuels, and describe the uncertainties in the evidence base; describe the potential effects of increased levels of carbon dioxide and methane on the Earth's climate and how these effects may be mitigated, including consideration of scale, risk and environmental implications" (p 26)
	Science GCE AS and A Level		There is no explicit mention of climate change. There are references to sustainability, and the "conflict between human needs and conservation (to) help maintain sustainability of resources." (p 7)
DfE	Environmental Science: GCE AS and A Level	2015	There are two explicit mentions of climate change: ""global climate change: how interconnected natural systems cause environmental change: negative and positive feedback mechanisms and tipping points … the difficulties of monitoring and predicting climate change" (p 7). There is climate change related content elsewhere in the subject content
DfE	Citizenship studies GCSE	2015	There is no directly expressed intention in relation to climate change education, or climate change. There could be opportunities to bring climate change into the subject content.
DfE	Economics GCSE	2015	There is no directly expressed intention in relation to climate change education, or climate change.
	Economics GCE AS and A Level	2014	There is no directly expressed intention in relation to climate change education, or climate change. There is one reference to the environment: "The impact of social, institutional, technological and environmental change, and globalisation on present and future economic behaviour must be considered." (p 3)
DfE	Design & Technology GCSE	2015	There is no directly expressed intention in relation to climate change education, or climate change. Sustainability and environment are mentioned.
	Design &Tech GCE AS and A Level		There is no directly expressed intention in relation to climate change education, or climate change. Sustainability and environment are mentioned.

[22] There are two GCSE Science routes. In Combined Science (sometimes referred to as Double Science) students are examined in three science disciplines (Biology, Chemistry and Physics) and awarded two GCSEs. In Single Science (sometimes referred to as Triple Science) students study and are examined in the three sciences as separate subjects.

DfE	Geology GCSE	2015	There is no directly expressed intention in relation to climate change education, or climate change.
	Geology GCE AS and A Level	2016	There is one direct mention of climate change as a Non-Core opportunity: ""the application of evidence to study frequent changes in global climate that characterise the Quaternary period… hominin evolution in response to repeated large scale environmental and climate change, including hominin evolution up to Homo sapiens" (p 10)
DfE	Business: GCSE	2015	There is no directly expressed intention in relation to climate change education, or climate change.
	Business GCE AS and A Level	2014	There is no directly expressed intention in relation to climate change education, or climate change.
DfE	Media studies GCSE	2016	There is no directly expressed intention in relation to climate change education, or climate change.
	Media studies GCE AS and A Level		There is no directly expressed intention in relation to climate change education, or climate change.
DfE	Politics GCE AS and A Level	2016	There is one direct mention of climate change in an example of Global Governance: "the role and significance of institutions of global environmental governance: including the UN Framework Convention on Climate Change (UNFCCC)" (p 11); and an indirect reference to climate change: "the ways and extent to which these institutions address and resolve contemporary global issues, such as those involving conflict, poverty, human rights and the environment" (p 11). Notably, 'Ecologism' is listed as a political idea, the last of 8, after, e.g. Liberalism, Conservatism, Anarchism, Feminism) (p 7).
DfE	History GCSE	2014	There is no directly expressed intention in relation to climate change education, or climate change.
	History GCE AS and A Level		There is no directly expressed intention in relation to climate change education, or climate change.
DfE	Sociology GCSE	2016	There is no directly expressed intention in relation to climate change education, or climate change.
	Sociology GCE AS and A Level	2014	There is no directly expressed intention in relation to climate change education, or climate change.

DfE	Philosophy GCE AS and A Level	2015	There is no directly expressed intention in relation to climate change education, or climate change.
DfE	Law GCE AS and A Level	2016	There is no directly expressed intention in relation to climate change education, or climate change.

Appendix 3 Policy note-taking template (example)

Policy	Climate Change Act
Organisation	UK Government
Published	2008
Review Date	17 February 2020
# pages	108
Purpose	"The Climate Change Act 2008 is the basis for the UK's approach to tackling and responding to climate change. It requires that emissions of carbon dioxide and other greenhouse gases are reduced and that climate change risks are prepared for. The Act also establishes the framework to deliver on these requirements." The Act sets a target that the UK government must meet, it also establishes the Committee on Climate Change to ensure the emissions targets are evidence-based and independently assessed. From the introductory blurb: "An Act to set a target for the year 2050 for the reduction of targeted greenhouse gas emissions; to provide for a system of carbon budgeting; to establish a Committee on Climate Change; to confer powers to establish trading schemes for the purpose of limiting greenhouse gas emissions or encouraging activities that reduce such emissions or remove greenhouse gas from the atmosphere; to make provision about adaptation to climate change; to confer powers to make schemes for providing financial incentives to produce less domestic waste and to recycle more of what is produced; to make provision about the collection of household waste; to confer powers to make provision about charging for single use carrier bags; to amend the provisions of the Energy Act 2004 about renewable transport fuel obligations; to make provision about carbon emissions reduction targets; to make other provision about climate change; and for connected purposes. [26th November 2008]"
Audience	Policy makers and law makers
Keyword search	Education, training, awareness, engage(ment) = 0 Capacity = 2 (capacity of a person on the Adaptation Sub-Committee; and the capacity of national authorities) Carbon = 235 Emission = 157 Greenhouse 110 Climate change = 236 Global warming = 1 Sustainable development = 4 - 13. Duty to prepare proposals and policies for meeting carbon budgets….(3) the proposals and policies, taken as a whole, must be such as to contribute to sustainable development. - 58. Programme for adaptation to climate change (2) The objectives, proposals and policies must be such as to contribute to sustainable development. - 125A General functions of the Administrator: (2) It is the duty of the Administrator to promote the supply of renewable transport fuel whose production, supply or use— (a) causes or contributes to the reduction of carbon emissions, and (b) contributes to sustainable development or the protection or

	enhancement of the environment generally.
Intention relative to climate change	To outline the commitment of the UK government to reducing greenhouse gas emissions by at least 100% of 1990 levels (net zero) by 2050 (https://www.theccc.org.uk/tackling-climate-change/the-legal-landscape/the-climate-change-act/) The Act requires government to set legally binding carbon budgets to work towards the 2050 target. The first five carbon budgets are in legislation, up to 2032. It identifies greenhouse gases and identifies that international aviation and shipping are not included in the account, as per 30 (1): "Emissions of greenhouse gases from international aviation or international shipping do not count as emissions from sources in the United Kingdom for the purposes of this Part, except as provided by regulations made by the Secretary of State." The provisions pertaining to the Committee on Climate Change include that committee membership will include a range of experience and knowledge, incl. related to social impacts of policies, but does not include skills related to engagement, communication, community building, education, participation - Schedule 1 (1) (3) : In appointing a member, the national authorities must have regard to the desirability of securing that the Committee (taken as a whole) has experience in or knowledge of the following: (a) business competitiveness; (b) climate change policy at national and international level, and in particular the social impacts of such policy; (c) climate science, and other branches of environmental science; (d) differences in circumstances between England, Wales, Scotland and Northern Ireland and the capacity of national authorities to take action in relation to climate change; (e) economic analysis and forecasting; (f) emissions trading; (g) energy production and supply; (h) financial investment; (i) technology development and diffusion. - There are provisions for the committee to establish sub-committees (on top of the adaptation sub-committee). An audit committee has been established (there is no committee for education).
Intention relative to education	There are no references to education within the document. Relevant sections could be: Part 2 Committee on Climate Change; Part 4 Adaptation; Part 5: Other Provisions, including waste and the Committee on Climate Change (which seems to have the teeth/authority relative to climate change in England (I should have interviewed?) Arguably, there could be scope within the Committee on Climate Change provisions to think about/consider education and expect the DfE to act via the following statements: - Notes on Committee on climate change/ Functions of the committee (Part 2: 34) are that the committee focuses on "sectors of the economy" (so economy is the driver, (34.(1) (d) "the sectors of the economy in which there are particular opportunities for contributions to be made towards meeting the carbon budget for the period through reductions in emissions of targeted greenhouse gases." This could include departments as responsible for their emissions where education is

	responsible for (what proportion of public sector emissions?) - Duty to provide advice or other assistance on request (1) The Committee must, at the request of a national authority, provide advice, analysis, information or other assistance to the authority in connection with— (a) the authority's functions under this Act, (b) the progress made towards meeting the objectives set by or under this Act, (c) adaptation to climate change, or (d) any other matter relating to climate change - 86.(1)- (8): there are requirements for govt to report on the improvements in the civil estate, which includes buildings for purposes of central government administration, and those that treasury has responsibility for in relation to efficiency and sustainability. I suspect that is central DfE facilities, rather than schools
Intention relative to climate change education	There are no references to climate change education
Synthesizing commentary (Anderson and Holloway, p 12)	The policy focuses on carbon targets, accounting, budgeting and associated administrative and governance provisions. There is no emphasis or effort related to education mentioned, and it devolves the authority to the Committee on Climate change. The response to climate change is then governed by Defra in relation to adaptation, and to BEIS in relation to mitigation.

Appendix 4 Search terms to support policy familiarisation

Policy families	Sample search terms	
Higher Education School Education Curriculum	Climate [change/ change education/ science] Sustainable/sustainability [Sustainability education / Sustainable development/ Education for sustainable development / Sustainable consumption]	Environment [Environmental education] Global [warming/citizenship] Creative [creative/creativity]; innovate [innovate/innovation Greenhouse/emissions
Climate change	Education Learning Skills/Training Engage [Engagement] Capacity [Capacity Building]	School [schools/schooling] Youth Children Pupil[s]
Environment and sustainability-related	Education, training, awareness, engage(ment) Learning School/schooling Youth Children Climate change	Capacity Carbon Emission Greenhouse Global warming Natural

Appendix 5 Sample recruitment email

From: Greer, Kate
Sent: [redacted]
To: [redacted]
Subject: Climate Change Education Research - invitation to participate

Dear [redacted]

By way of introduction, I am a PhD candidate in the School of Education, Communication and Society (ECS) at King's College, working under the supervision of Melissa Glackin and Heather King in the CRESTEM research group. [redacted]. Today, I am writing to invite you to participate in my research.

My research is examining the state of climate change education in England through the perspective of 'policy actors' and 'political actors'. I am interested in a wide range of perspectives on the role of education generally, and schools specifically, in relation to climate change, and the role of education policy and other influential organisations, [redacted] in this area. Although there has been some research on the perspectives of teachers, students and environmental educators related to climate change and education, there has been little attention paid in England or further afield, to explore the views of a broader group of stakeholders who have the potential to influence how these important issues could be addressed within schools. Given your professional interest in science education, [redacted] you were recommended to me as someone who might have an interesting perspective to contribute to my research.

If a discussion of your ideas related to these themes is of interest, I can forward you some further information and would be happy to answer any questions you might have. If you then decide to participate, we can confirm a suitable time and location to meet for an interview (approx. 1 hour). I understand that you will be [redacted] which, if you are interested in participating, might be a convenient opportunity to meet.

I do hope you will find this invitation to be of interest and that I hear from you soon.

Yours sincerely,

Kate

Kate Greer
PhD Candidate
School of Education, Communication and Society
King's College, London

Appendix 6 Sample follow-up email

On [redacted] at 09:42, Greer, Kate <[redacted]> wrote:

Good morning [redacted].

I was just writing to you to thank you for your time yesterday. Our discussion has given me so much to think about with several of the ideas and concepts discussed adding a refreshing, macro, dimension to the perspectives I've gathered so far. Please let me know if there are any further points you would like to make or anything you would like to clarify at this point.

I also do appreciate your offer of further discussion. In a few months' time as I start to develop my ideas into a (hopefully) coherent story, I will be in touch.

Thanks for these details below. Further, do you have any contacts with DfE or Ofsted?

Oh, and if you do have a preferred pseudonym, please do let me know.

Best wishes,

Kate

Kate Greer
[redacted]

Appendix 7 Sample interview guide

Interview Guide
Admin
- Time frame - Confidentiality/pseudonyms - Audio-recording and turning off TURN ON RECORDER - Questions/consent form
Intro
Background to me and research - Secondary teacher - Govt and NGOs: env/sustainability, policy/delivery - REEEP/CEC – climate negotiations/clean energy - Attention paid to teachers/students persp; but not policy makers/political actors re CCE Why you - presentation you gave at IPCC workshop; climate justice and global perspective of CC; developed/developing nations; responsibility; sub-state actors
Career and Influences
- Brief: Your career path, what are you doing now? - What has prompted the moves? Drivers/influences?
Current work
- How your current work relates to CC? And education? And schools? (future generations? responsibility?) - Other work in your orgs related to CCE? Research? Advocacy? Policy commentary? Teaching? - Challenges/debates/obstacles related to CCE? - New developments/directions?
Influence /impact re: your work
- People/orgs who drive/influence your work in this area (Stakeholders? teachers? Government? International actors?) - Policies/politics (international policies, SDGs, CC Act, COP2020, IPCC?) - (How) could your work be more influential? (CCE and justice and global perspectives)
CC and CCE in schools, and in society
- What should CCE be in schools? (Prim vs Sec?) Mitigation? Adaptation? Impact reduction? Justice? - For you, does CCE sit amongst EE, ESD, SE, or…? - Position of the role of schools, or responsibility of schools, in CC?
CCE in England
- How will England's schools experience CC? (refs risk; flood/drought/heat/social changes/) - Is there enough attention paid to issues of CC in English schools? - Who else, what organisations/policies are involved in delivery/design/advocacy of schools' response to CC? - Who/what is (or could be) influential in climate change and education in England? Where does responsibility lie?
Closing
- Any questions/follow ups/additions? - Other people/orgs/policies - Pseudonym

Appendix 8 Transcript sample

X= position-holder
K = interviewer

X: We've taken repeated decisions here that there's nothing just yet that fits a gap and there's quite a lot to sort out with school's education, and if you've got limited resource that's what you do. And because during the years I've been here, actually, the computing side has grown. So, there's a new subject in the curriculum, that's going to inexorably … more bandwidth required. So, we've done that step. But the unique thing about this role over most of the other roles in the sector, is the span across the different disciplines, combined with the authority that you've got from this organisation and its fellowship. Most of the people I work with are either working in a science, or the sciences, or engineering, or computing, or mathematics, but there are very few people, if any, who are doing that span.

(09:03.19)

K: Can you talk a bit about the policy influencing role that you do and, or that the Society does?

X: Um, so, we, so going back to that publication from 2014, that set out what we thought education should look like long-term. So, we use that as a (cycling? unclear 09:23.82) device to ourselves to work out what the policy areas we should be focusing on now. And how that works is there's the kind of formal track and the informal track. So the formal track would be we gather evidence on a particular policy question, or we do some, increasingly we're looking at doing proof of concept, and then throwing that back to the department and saying, you've got this, here is some evidence that might help you make a decision, or here's some evidence that we think, there's a recommendation, um …

K: So, you select the issues?

X: We select the issues. So, we triage. The space is quite large. You could do a lot of different things. Um, the strategy we have looks at what can we uniquely do. So, it is things that cross, if there is an issue that crosses the different disciplines, that is one that is likely to percolate up. If there's one that's nationally, strategically important, that will get higher. Those are probably the two main ones. And then there's the, if nobody else is doing it argument. If there is a gap. So, if we can use our leadership, our convening power, or by partnering with someone, we will take it forward. So that's the triage. What that looks like in real life is me working with the committee chair and with a committee, and with my boss and the team, looking at what's there and identifying a small number of things that we think we've got ability to get traction on, or are absolutely so important that if we don't do something, disaster will loom.

K: For instance?

X: Um, so computing is a really good one. Um, there's two to pull out. One, the, I'll do the long-term ambition that's been in the news this week. The fellowship, the society firmly believe that the current structure of 16-18 education at least, and potentially further down, is not going to support the economy in the future, or support citizens either. Um, there aren't many organisations that can take a really long-term view and run for something over ten or 15 years so we've selected that as something that the RS, with its longevity, with its gravitas, can continue to push at and nibble at in lots of different directions. So that's kind of a really long term one. A much more responsive-mode one, would be, we called for a new computing curriculum in 2012, it then happened at exactly the time that there was no money so government didn't invest, and we were watching, going, errr, errr, this could be a car-crash. People were coming to us saying, can you do something about this? So, we then went and got the evidence that Treasury would need to invest.

(12: 08:02)

K: Mmm. How do you navigate that difficult, so in talking to some other stakeholders, they say they don't want to become the place where people come to dump their issues? You know?

X: Yeah.

K: And you go and solve all the issues of society through science. And science can be, you know, pointed to, or sought to provide those answers, and so how do you avoid then, just becoming an irritating lobbyist rather than someone who the Department, say, actually welcomes responses from?

X: That's really interesting. I was talking to, I was coaching someone on this similar topic I think yesterday. So, how do you do it? Um, what I think it looks like is sustained engagement with the Department of a long period of time at a number of different levels. And that's sort of how I've worked on my collaborations. So, we've made sure that there are relationships between our president and senior people, wherever that is. So, for us, that's the Council of Science and Technology, which reports into the Prime Minister. You can't get much more senior than that. And or perm secretary level, and also the secretaries of states. Then we go with our committee chair who will be talking to director generals, at that level, and then I make sure I'm talking to Directors and DDs and the team are talking to staff. You know that when you're working with officials, everybody moves all the time so getting that right, the other thing that we have done increasingly in this building, is pulled staff in who have worked in government or other agencies, and we sent me into government for a period, just for a six-week block. Only quite recently, but it was interesting to sit on the other side. Um, without trying to be captured. But, yeah, it's a, understanding the needs and requirements whilst retaining your own independence is the thing I probably find trickiest but your bit about issues, which is really interesting, because one of the first things that somebody said to me in this role was, 'You are going to find that

the world and his wife is going to contact you to say, could the [redacted] de-de-de-de-de-de, and you're going to need a way of triaging that because you can't afford to do everything and you shouldn't do everything.'
(14:21.66)

K: But you also can't just blatantly resist and become closed off, because you've got to be responsive and connected with the society around you also, to be able to recognise the needs.

X: So, how we handle some of that, it's being a connector or a super-connector. [redacted] is one, and I think I do it quite well, if someone comes to you with something that you can't do, can't sort out, but you know the person they should talk to, you do that. And it's no skin off your nose. It doesn't necessarily reflect back. You'd tell your boss if you think it was an important one. You'd go, 'By the way, I did that.' Um, but you do that. The other thing we do for some of that kind of work is use the convening piece. So, if someone has got a, people will come to [redacted] if we invite them and if there is an issue that we think is important but we don't, this is more the informal side, but we don't want to do a big piece of work on but we'd like to, ah, indicate we're interested and get some conversations happening, you invite them in. Whether it's for afternoon tea, for dinner, for a seminar, for a lunch, for a breakfast. You get the right mix of people together and we tend to get, not always a perfect mix, but a good mix of people will come in from different walks, and that's helpful.

Appendix 9 Field notes template

Interviewee #: (Pseudonym)____
Date of interview: _____
Date of field notes: _____

Perspectives on the role of education in response to issues of climate change
Field notes and reflection

Comments about the participant
Comments about the setting
Key themes/ideas
What struck me as salient, interesting, illuminating or important during this interview?
Reflections on my technique, questions to change, issues to highlight, words to use
People or resources to follow up

Appendix 10 Nodes and sub-nodes

Node	Sub-node
About Climate Change Education	
Climate Change Education	Alignment with STEM As Geography Content related to local & global Ethics & justice content Ideas related to action & agency Ideas related to continuums, systems & spectrum Key knowledge & critical skills Part of sustainability & environment Science-based characterisations
Allies	Data, Artificial Intelligence, Computing Mental health & wellbeing Outdoor learning
Teaching	How to teach CCE: pedagogy Teacher skills confidence efficacy Teacher training & support needs
Adaptation incl. education & schools	
CCE in the context of big social issues	
Disciplines & interdisciplinarity	
Ideas related to indoctrination & campaigning	
Sufficiency of CCE	
About Education	
Capabilities	
Purpose of education & schools re climate change	
Purpose of education	
About Influence	
Interviewees	Career path & background Current role Professional Motivations Influencing the influencers Organisation aims & objectives
Methods	How individuals exert influence How organisations influence (non-policy)

	Influencing curriculum Influencing policy makers & (non-curriculum) policy Influential policies & political events Prioritisation of CC & or education
Stakeholders	Academia and Academics Funders Geography Government Media Non-state actors & charities Partnerships & networks Science Teachers & Schools The place of young people (influence, responsibility & burden)

Appendix 11 Ethical approval

Research Ethics
Office

Franklin Wilkins Building
5.9 Waterloo Bridge Wing
Waterloo Road
London SE1 9NH
Telephone 020 7848 4020/4070/4077
rec@kcl.ac.uk

KING'S College LONDON

Kate Greer

24 October 2018

Dear Kate

LRS-18/19-6434 - Perspectives on climate change education

Thank you for submitting your application for the above project. I am pleased to inform you that your application has now be approved with the provisos indicated at the end of this letter. All changes must be made before data collection commences. The Committee does not need to see evidence of these changes, however supervisors are responsible for ensuring that students implement any requested changes before data collection commences.

Ethical approval has been granted for a period of **three years** from24 October 2018 You will not be sent a reminder when your approval has lapsed and if you require an extension you should complete a modification request, details of which can be found here:

https://internal.kcl.ac.uk/innovation/research/ethics/applications/modifications.aspx

Please ensure that you follow the guidelines for good research practice as laid out in UKRIO's Code of Practice for research: https://internal.kcl.ac.uk/innovation/research/ethics/contact.aspx

Any unforeseen ethical problems arising during the course of the project should be reported to the panel Chair, via the Research Ethics Office.

Please note that we may, for the purposes of audit, contact you to ascertain the status of your research.

We wish you every success with your research.

Yours sincerely,
Miss Annah Whyton

Senior Research Ethics Officer

For and on behalf of:
E&M Research Ethics Panel

Final Dual Review Decision: Approved with Provisos

Major Issues (will require substantial consideration by the applicant before approval can be granted)

Minor Issues related to application (the reviewer should identify the relevant section number before each comment)

B6 - You report that interviews may be conducted in a public space - do ensure that the location of the interview does not compromise the ability of the participants to respond freely. Select locations in which the anonymity of the participants will not be compromised.

B9: Please ensure that consent is obtained at the point of interview, with the attendance of the researcher. This allows participants to ask any last minute questions they wish to, and additionally you can confirm with participants that they are happy with all the points of consent. You should keep the hard copy of the consent form, with participants keeping the information sheet.

B9 - As you are interviewing potentially well known policy actors, do consider how your transcription process can ensure the anonymity of respondents whose style of talking may be well known.

C3: If you are recruiting through snowball sampling please ensure that all participants are assured that their participation is voluntary, and their choice regarding participation will not be fed back to any individuals.

Minor Issues related to recruitment documents

There is a discrepancy in the data withdrawal dates within the recruitment documents – the information sheet states 4 months while the consent form states 4 weeks (point 2). Edit the documents to reflect the same duration or provide a specific date for potential data withdrawal.

On your consent form, in the uploaded version, the top two tick boxes are misaligned - do check the final version has the appropriate formatting.

On your consent form, you include: '10. I have informed the researcher of any other research in which I am currently involved or have been involved in during the past 12 months'. Is this strictly necessary? Please remove if not.

Information Sheet: In line with the feedback under point B9, please amend the "Do I have to take part?" paragraph accordingly.

Advice and Comments (do not have to be adhered to, but may help to improve the research)

In section B8, and your email invitation, you describe your interviews as unstructured, yet you provide a highly detailed series of interview prompts - I would conceptualise your approach as, at least, semi-structured interviewing.

Appendix 12 Information sheet

Version 4 - 04/04/19
Ethical Clearance Reference Number: LRS-18/19-6434

INFORMATION SHEET FOR PARTICIPANTS

KING'S College LONDON

PLEASE KEEP THIS INFORMATION SHEET

Title of study: Perspectives on Climate Change Education

I would like to invite you to participate in this research project which forms part of my PhD studies. Before you decide whether you want to take part, it is important for you to understand why the research is being done and what your participation will involve. Please read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

The purpose of the study is to examine perspectives on the role of education in response to climate change and the factors influencing those perspectives. The research will include exploratory interviews with people working in fields relevant to the research topic. This research will provide new insight into the state of climate change education in England and provide some insights to inform policy and practice in the future.

Why have I been invited to take part?

You are being invited to participate in this study because you work in a charity organisation, civil service organisation or private enterprise in England and you may have relevant experience related to the research topic, e.g. climate science, education, environmental education. All invitees will be people whose work relates in some way to climate change education.

Do I have to take part?

Participation is completely voluntary. You should only take part if you want to and choosing not to take part will not disadvantage you in anyway. Once you have read this information sheet, please contact me if you have any questions that will help you decide whether to take part.

What will happen if I take part?

If you choose to take part in the study, you will be given this information sheet and a consent form. You will be asked to read this information sheet and the consent form and ask any questions. At the beginning of the interview, I will ask you to sign a copy of the consent form. The interview will take approximately one hour and will be held in a location convenient to you (e.g. your workplace, a quiet café or public space) and, with your consent, will be audio-recorded. During the interview you will be asked for your views on climate change, issues of climate change as they relate to education, and about your work.

What are the possible risks of taking part?

There are no foreseeable risks in participating in this study. The study has been deemed as low risk by the College Research Ethics Committee at King's College London on the basis that it is ethically sound research in terms of participant selection and participation, and in the ways the data is collected and stored.

What are the possible benefits of taking part?

The information I get from this study will help to further understanding of current perspectives on climate change education in England and what is influencing those perspectives. This will be useful for thinking about the future of climate change education within this country and further afield.

Data handling and confidentiality

Your data will be processed in accordance with the General Data Protection Regulation 2016 (GDPR). Data generated as part of the research will be regarded as strictly confidential and will not be shared beyond the PhD researcher and the two PhD supervisors, Dr Melissa Glackin and Dr Heather King. Data will be stored online in password-protected, encrypted format and transcripts and questionnaires will have personal references removed so that they cannot be linked to an individual. These records will be stored separately to identifiable records. All hard copies will be stored in a secure, restricted access office. Data will be stored until September 2026 (in accordance with the College's Records and Data Retention Schedule, this timing is four years following the intended completion of the research study). In reporting on the research findings, anonymity cannot be guaranteed, however, with your consent, you will be given a pseudonym. You will be given the opportunity to choose your pseudonym. Organisation types (e.g. civil service, charity organisation) may be referred to but organisation names will not.

Data Protection Statement

The data controller for this project will be King's College London (KCL). The University will process your personal data for the purpose of the research outlined above. The legal basis for processing your personal data for research purposes under GDPR is a 'task in the public interest'. You can provide your consent for the use of your personal data in this study by completing the consent form that has been provided to you.

You have the right to access information held about you. Your right of access can be exercised in accordance with the General Data Protection Regulation. You also have other rights including rights of correction, erasure, objection, and data portability. Questions, comments and requests about your personal data can also be sent to the King's College London Data Protection Officer Mr Albert Chan info-compliance@kcl.ac.uk. If you wish to lodge a complaint with the Information Commissioner's Office, please visit www.ico.org.uk.

What if I change my mind about taking part?

You are free withdraw at any point of the study, without having to give a reason. Withdrawing from the study will not affect you in any way. You are able to withdraw your data from the study up until 30 April 2019, after which point your data will be incorporated into the analysis and committed to the findings. If you choose to withdraw from the study, we will not retain the information you have given thus far.

How is the project being funded?

This study is being funded by the Rosalind Driver Scholarship Fund, administered by King's College London (https://www.kcl.ac.uk/sspp/departments/education/research/Research-Centres/crestem/Research/Rosalind-Driver-Memorial-Funds/Rosalind-Driver-Research-Scholarship-Memorial-Fund.aspx)

What will happen to the results of the study?

The results of the study will be presented in a doctoral thesis and, potentially, in academic publications and conferences within the UK and internationally. A summary of the research will also be sent to research participants and funders once I have finished my PhD.

Who should I contact for further information?

If you have any questions or require more information about this study, please contact me using the following contact details:

Kate Greer
PhD Candidate
School of Education, Communication and Society
Faculty of Social Sciences and Public Policy
King's College, London
kate.greer@kcl.ac.uk

What if I have further questions, or if something goes wrong?

If this study has harmed you in any way or if you wish to make a complaint about the conduct of the study you can contact King's College London using the details below:

Supervisor
Dr Heather King
School of Education, Communication and Society
Faculty of Social Sciences and Public Policy
King's College London
heather.1.king@kcl.ac.uk

Thank you for reading this information sheet and for considering taking part in this research.

Appendix 13 Consent form

Version 4 – 04/04/19

CONSENT FORM FOR PARTICIPANTS IN RESEARCH STUDIES

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

KING'S College LONDON

Title of Study: Perspectives on Climate Change Education

King's College Research Ethics Committee Ref: LRS-18/19-6434

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

	Please tick or initial
I confirm that I understand that by ticking/initialling each box I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes mean that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element I may be deemed ineligible for the study.	☐
1. I confirm that I have read and understood the information sheet (Version 4 – 04/04/2019) for the above study. I have had the opportunity to consider the information and asked questions which have been answered to my satisfaction.	☐
2. I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason, up until 30 April 2019.	☐
3. I consent to the processing of my personal information for the purposes explained to me in the Information Sheet. I understand that such information will be handled in accordance with the terms of the General Data Protection Regulation.	☐
4. I understand that my information may be subject to review by responsible individuals from the College for monitoring and audit purposes.	☐
5. I understand that confidentiality and anonymity will be maintained, as far as is possible. I will be given a pseudonym in all research outputs and my organisation will not be named.	☐
6. I agree to be contacted in the future by King's College London researchers who would like to invite me to participate in follow up studies to this project, or in future studies of a similar nature.	☐
7. I agree that the research team may use my data for future research and understand that any such use of identifiable data would be reviewed and approved by a research ethics committee. In such cases, as with this project, data would not be identifiable in any report.	☐

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8. I understand that the information I provide will be included in a summary report for participants and I wish to receive a copy of it. ☐

9. I consent to my interview being audio recorded. ☐

Name of Participant	Date	Signature

Appendix 14 Direct mentions, direct references and additional opportunities for climate change education in the curriculum

Subject	Stage	Extract	Commentary
Direct mentions of climate change			
Chemistry	KS 4	"Earth and atmospheric science: evidence for composition and evolution of the Earth's atmosphere since its formation; evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change; potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate; common atmospheric pollutants: sulphur dioxide, oxides of nitrogen, particulates and their sources; the Earth's water resources and obtaining potable water. (p. 221)	This is the last section of chemistry in KS1-4 curriculum; note the neutral tone and implication of uncertainty.
	GCSE (Combined and Single Science)	Evaluate the evidence for additional anthropogenic causes of climate change, including the correlation between change in atmospheric carbon dioxide concentration and the consumption of fossil fuels, and describe the uncertainties in the evidence base; describe the potential effects of increased levels of carbon dioxide and methane on the Earth's climate and how these effects may be mitigated, including consideration of scale, risk and environmental implications. Common atmospheric pollutants and their sources; describe the major sources of carbon monoxide, sulfur dioxide, oxides of nitrogen and particulates in the atmosphere and explain the problems caused by increased amounts of these substances." (p. 26 – 27)	Suggests uncertainty about causes of climate change. Ascribes anthropogenic causes secondary status: "additional"
Environmental Science	GCE AS and A Level	"Global climate change: how interconnected natural systems cause environmental change: negative and positive feedback mechanisms and tipping points … the difficulties of monitoring and predicting climate change." (p. 7)	Only direct mention of CC; that natural systems cause env change.
Geography	GCE AS and A Level	"How landforms and landscapes evolve as result of processes driven by past, present and future climate changes." (p. 8)	Positioning CC alongside past and future changes diminishes the severity of the current situation

Geology GCE	AS and A Level	Non-Core opportunity: "the application of evidence to study frequent changes in global climate that characterise the Quaternary period… hominin evolution in response to repeated large scale environmental and climate change, including hominin evolution up to Homo sapiens" (p. 10)	Climate change is a non-core matter, presented as a historically recurring phenomenon thus downplays significance of current crisis.
Politics GCE	AS and A Level	Global Governance: "the role and significance of institutions of global environmental governance: including the UN Framework Convention on Climate Change (UNFCCC)." (p. 11)	
Direct references to climate change without stating "climate change"			
Chemistry	KS 3	"Earth as a source of limited resources and the efficacy of recycling; the carbon cycle; the composition of the atmosphere; the production of carbon dioxide by human activity and the impact on climate." (p. 207)	The searchable term "climate change" is not used; the "impact on climate" is referenced.
Chemistry	KS 4	"Potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate." (p. 221)	
Geography	KS 3	"Physical geography relating to: geological timescales and plate tectonics; rocks, weathering and soils; weather and climate, including the change in climate from the Ice Age to the present; and glaciation, hydrology and coasts." (p. 243) "Understand how human and physical processes interact to influence, and change landscapes, environments and the climate; and how human activity relies on effective functioning of natural systems." (p. 243)	The searchable term "climate change" is not used; "change in climate" is referenced. Positioning climate change in context of Ice Age to present diminishes the severity of the current crisis. 'Interactions' and 'influence' are neutral terms. A reliance on 'natural systems' to function effectively for humans.
Geology	GCSE	"Past global temperatures and sea level changes: the major sources of carbon dioxide in the atmosphere (volcanic emissions and burning of fossil fuels); the evidence for changes in climate through geological time (icehouse to greenhouse conditions) and sea level from sedimentary rocks (tillite, limestone and drowned	- that volcanoes and burning of fossil fuels are equivalent. That changes in climate are historical

		forests); the evidence for changes in atmospheric carbon dioxide levels over geological time (sedimentary rock and ice cores)" (p. 6)
Clear opportunities for addressing climate change		
Geography	KS 3	"Human geography relating to: population and urbanisation; international development; economic activity in the primary, secondary, tertiary and quaternary sectors; and the use of natural resources." (p. 243)
	GCE AS and A level	"The impact of human activity as another factor causing change within landscape systems." (p. 8)
Biology	GCSE Single subject	"Explain the importance of the carbon cycle and the water cycle to living organisms …; evaluate the evidence for the impact of environmental changes on the distribution of organisms, with reference to water and atmospheric gases." (p. 16) "Some of the biological challenges of increasing food yields using fewer resources; describe some of the biological factors affecting levels of food security including increasing human population, changing diets in wealthier populations, new pests and pathogens, environmental change, sustainability and cost of agricultural inputs; describe and explain some possible biotechnological and agricultural solutions, including genetic modification, to the demands of the growing human population." (p. 17)
Physics	GCSE (Combined Science)	"Calculate energy efficiency for any energy transfer, and describe ways to increase efficiency; describe the main energy sources available for use on Earth (including fossil fuels, nuclear fuel, bio-fuel, wind, hydro-electricity, the tides and the Sun), compare the ways in which they are used and distinguish between renewable and non-renewable sources; explain patterns and trends in the use of energy resources." (p. 29)
Environmental	GCE AS	"The physical environment: The emphasis should be placed on understanding how

Science	and A Level	anthropogenic activities are interconnected with physical processes, to formulate management strategies and plan sustainable activities." (p. 7)	
Examples of other opportunities (inexhaustive list)			
Science	KS 1-4	Purpose of science education includes to: "develop a sense of excitement and curiosity about natural phenomena." (p. 168) Key Stage 4: "ensure students have the knowledge to enable them to develop curiosity about the natural world." (p. 212)	There are opportunities for discourse advocating for the natural environment.
Physics	KS 3	Energy: "domestic fuel bills, fuel use and costs; fuels and energy resources." (p. 208) Energy changes and transfers: "other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels." (p. 208)	
Biology	KS 4	"Positive and negative human interactions with ecosystems." (p. 218)	Relationships presented positively; opportunities for environmental advocacy.
Geography	KS 2	Locational knowledge (KS 2 -3), e.g. human and physical characteristics, land-use patterns and changes over time. (p. 242) "Physical geography" e.g. climate zones (p. 242) "Human geography, including: types of settlement and land use, economic activity including trade links, and the distribution of natural resources including energy, food, minerals and water." (p. 242)	Curriculum could be interpreted to promote climate change action/environmental advocacy but no incentive to do so
	KS 3	Locational knowledge, e.g. "deepen their spatial awareness of the world's countries … focusing on their environmental regions, including polar and hot deserts, key physical and human characteristics…" (p. 243) Human geography: "population and urbanisation; international development; economic activity in the primary, secondary, tertiary and quaternary sectors; and the use of natural resources." (p. 243)	

	GCSE	People and environment: "Global ecosystems and biodiversity "…interdependence of climate, soil, water, plants, animals and humans; the processes and interactions that operate within them at different scales; and issues related to biodiversity and to their sustainable use and management." (p. 7)	Various opportunities although no direct references.
	GCE AS and A Level	"Interrogate people-environment interactions and people-place connections at all scales from local to global" (p. 4)	
English	KS 1-4		Various opportunities through selections of texts, issues or witting
Mathematics	KS 1 - 4		Skills basis for STEM studies, and creativity, analytical thinking. Opportunities for CC as a theme.
Art and Design	KS 1-4	References to "creativity", "critical thinking", and how "art and design reflect and shape our history, and contribute to the culture, creativity and wealth of our nation." (p. 225)	Qualities are important in considering CCE; opportunities to consider material and commentary that art makes about the world.
Citizenship		Purpose: "to provide pupils with knowledge, skills and understanding to prepare them to play a full and active part in society … to explore political and social issues critically, to weigh evidence, debate and make reasoned arguments." (p. 227)	Opportunities related to participation in society, democracy, government, critical exploration of issues, weighing up evidence; opportunities related to exploring citizen agency.
History	KS 3	Non-statutory examples: "Britain as the first industrial notion – the impact on society." (p. 250) "Darwin's 'On the Origin on Species'." (p. 250) "Britain's changing landscape from the Iron Age to the present." (p. 251)	Implicit opportunities, up to the discretion of the teacher/school.
Languages	KS 2-3	"Learning a foreign language is a liberation from insularity and provides an	Opportunity for ideas related to

		opening to other cultures. A high-quality languages education should foster pupils' curiosity and deepen their understanding of the world." (p. 252)	global perspectives and empathy
Media studies	GCE AS A Level	"The way events, issues, individuals and social groups are represented through processes of selection and combination." (p. 7) "The way the media through re-presentation construct versions of reality" (p. 7) "The significance of patterns of ownership and control" (p. 8) "Analyse and compare how media products construct and communicate meanings through the interaction of media language and audience response." (p. 10)	Opportunity for critical media literacy related to how climate change is addressed in media, and how that affects public debate and society's response.
Sociology	AS and A Level	"The study of A Level sociology must focus on contemporary society. Studying sociology must foster the development of critical and reflective thinking with a respect for social diversity. It must provide an awareness of the importance of social structure and social action in explaining social issues. Students must be encouraged to develop their own sociological awareness through active engagement with the contemporary social world." (p. 1)	Opportunity for argument and debate, opinions, facts and judgements; analysis and evaluation of information in the social world; conflict and consensus; values; engagement with issues of inequality, change, power.
Philosophy	GCE AS and A Level	"Applied ethics: the use of conceptual tools of meta-ethics and normative ethics to address/resolve issues within at least four specified controversial issues." (p. 5)	Opportunity to focus on climate change as issue.

Appendix 15 2019 GCSE, GCE AS and A Level entries in England

Subject	GCSE	AS	A Level
Biology	167,525	9,180	64,460
Citizenship studies	20,425	-	-
Chemistry	160,980	8,175	55,615
Combined Science	786,830	-	-
Design & Tech	90,805	775	9,375
Geography	253,125	3,030	32,050
Physics	159,555	5,820	36,420
Other sciences	2,600	420	1,755
Psychology	NA	10,845	62,685

(Ofqual, 2019)

NB: GCSE subjects are broken into English Baccalaureate (EBacc) and non-EBacc subjects. In the table, Biology, Chemistry, Combined Science, Geography and Physics are EBacc subjects. In 2018-19 all EBacc subjects, except German and Modern Foreign Languages, reported increased entries.

Appendix 16 Climate change education principles and content mentioned by position-holders

General principles discussed by position-holders

- Complexity of climate change and difficulty of addressing it
- Age appropriateness
- Skills and knowledge enabling students to filter information
- A need for interdisciplinary connections

Content discussed in relation to geography education

- Understanding of the evidence base
- Connections between historical and anthropogenic climate change
- Landscape formation and change;
- Evidence of how the climate has changed from the ice age to the present
- Sea level rise, including the impact of thermal expansion vs melting ice caps;
- Growth and retreat of glaciers
- Natural/normal cyclical climate change patterns, sunspot activity, different cycles related to glaciations and anthropogenic influences
- Weather: sequenced learning of weather, climate, climate science, climate change (make weather interesting, relevant to everyone's everyday life); tropical cyclones; that one weather event is not climate change
- Soils and carbon cycling
- That one storm or weather event is not climate change
- Coastal flooding, salinization of freshwater tables and aquifers
- Climate change refugees
- Population
- Economy and economic change
- That CC manifests itself in different ways in different spatial contexts of different scales
- Causes and effects of climate change; feedback mechanisms and different countries responses
- Differences between mitigation and adaptation actions and issues (social, ethical economic)
- Geography skills and knowledge synthesis, develop geographical literacy, view climate change through geographical lens in terms of: spatial, people, places and the environment
- Geography as offering students a view of the world as positive/amazing, rather than dumping ground for issues

Content discussed in relation to science education

- Science of climate change
- Knowledge base on which earth is warming
- How much the Earth's temperature will rise and how long it will take
- Greenhouse effect, greenhouse gases, warming and sea level rises
- That the greenhouse effect has been "enhanced" by humans
- The carbon cycle, sinks and fluxes and links with atmospheric science
- Chemistry: industrial processes - that raw material is extracted from the earth and chemical processes are used to turn those resources into other materials/products
- Chemistry: understanding of gases in the atmosphere that are contributing

- The role of radiation and interaction of radiation with gases
- Atmospheric gases, role of radiation, sea levels, ice water, balance, density, the role of CO2 and the carbon dioxide cycle
- Climate change in the context of the energy system and energy consumption
- Biodiversity
- Earth science
- Evolution
- Carbon footprints
- Climate change and human impact on the environment
- Sixth mass extinction
- Tree rings as proxy for CC
- Citizen science (local connections, projects, understanding, appreciation, knowledge
- Science in the world as a positive and negative force
- Science as innovative and a force for good
- 'Big ideas and principles' of science
- History of ideas
- The place of humans in the world
- Global issues
- The need to break the link between greenhouse effect, consumption and growth
- Skills and understandings in the context of society's big issues, not just of climate change
- Scientific process: understanding how systems work, their drivers and how to make change
- Weighing up balance of probability, that science (including climate change) is not black and white
- Fair testing, experimentation that suggests we can get a yes/no answer is not enough
- Understanding and using qualitative and quantitative evidence (in Science and elsewhere), reasoning, consensus, statistics: scientific approach to looking at the evidence
- Debating how evidence is being evaluated and questions of mitigation and/or adaptation, not whether climate change is real and/or caused by human activity
- Epistemic knowledge: knowledge about knowledge and where it comes from
- Making informed choices, e.g. calculating impacts of certain foods.
- Scientific principle for action on climate change: understanding the key drivers in the system and which ones effect change

Content and ideas discussed in relation to ethics and justice

- Climate change education should address global and social justice, not just science
- Global aspects of climate change education; relative contributions of different countries to human-linked emissions over time: CC is a global problem created disproportionately by different countries to those bearing the consequences; it is being experienced differently around the world already;
- A global justice approach includes international collaborations
- Emphasise 'local' because climate change impacts experienced elsewhere can be immaterial for students in the UK
- Develop personalised and localised initiatives to foster local connections and local solutions, particularly in cities and urban centres
- That CC is a risk problem: risks are being taken by those not bearing the full consequences

- That people are affected differently because of where they live; that people in developing countries are suffering more
- Resource depletion and inequity (e.g. food)
- What you have by virtue of where you were born: comparing young person in UK to young person in South Sudan; food can be a way to discuss climate justice
- Ideas of justice and fairness towards future generations and less-developed countries
- Accountability of social actors: individuals, capable actors, non-state actors
- Social justice as lens into environmental ethics, e.g. the impact of large-scale commercial food production processes such as Nestle's impact on Orangutan habitat
- Social justice: global community (younger ages), international citizenship, refugees, climate change, poverty, global decision making
- Developing social responsibility and a social conscience and togetherness
- Ethics and morals
- Global citizenship and global community
- Human rights, refugees, poverty, social vulnerability
- Long-term, embedded curricular approaches, rather than isolated lessons or sessions

Content and ideas discussed in relation to mitigation and adaptation

- Mitigation, adaptation, risk reduction, early warning signs and post-impact management (i.e. responses to flooding)
- Learn about other countries adaptation: where is adaptation already occurring and how
- Options for mitigation and adaptation without advocating a particular lifestyle
- Learning about the problem and the solution together
- Food systems, developing food gardens
- Schools participation in resilience partnerships
- Travel options
- Changes to holidays/recreation
- Changes to jobs/employment
- Schools as part of planning for community resilience, participating in resilience partnerships, providing emotional support and physical infrastructure in communities
- Using the natural environment to teach about climate change adaptation; natural environment as a tool for human adaptation
- Schools operating within their environment and within 'one planet' limits: wind generation, solar systems, refurbish with sustainable materials, food production, orienting/refurbishing schools for passive heating and cooling
- Developing schools' resilience to heat disruptions relating to learning outcomes and school operations; resilience to flooding disruptions on schools and school communities
- Potential conflict between adaptation and mitigation strategies, e.g.: installing air-conditioning as adaptation can undermine emission reduction efforts, or insulating poor quality buildings can make the building more uncomfortable for students.
- Improvement of school supply chains and waste management practices, esp., related to food consumption, supply and production.

Content and ideas discussed in relation to sustainability

- Fossil fuels and energy production
- The positive progress regarding the changing energy paradigm and de-carbonisation of the grid

- CC should be talked about alongside sustainability and in relation to trade-offs (biodiversity, environment, oceans, land use, sustainability, circular economy, animal welfare): e.g. diesel in relation to greenhouse gas emissions, pollution and crops for fuel
- Carbon footprint as related to climate change education
- Carbon neutral schools
- Carbon footprint is important, but it is not climate change education
- Consumption is the central concept
- Consumption, growth and emissions
- Consumption – sustainable consumption, wastes/recycling/food consumption/food growing/food miles/carbon dioxide
- Consumption patterns are not part of climate change
- Food miles, diet,
- Plastics, as an offshoot of consumption and can inspire action
- Getting into nature, observing nature, caring about nature (Molly).
- Landscape/nature as directly tied to climate change (impacts)
- Learning in the outdoors: interaction with the env changes by changing the context in which they normally operate
- Landscape as inspiration and teaching tool
- Outdoor learning doesn't automatically lead to pro-environmental behaviour
- Ecology and pollution are impacted by climate change
- Travel/transport
- Air quality/pollution: atmospheric phenomenon, influences how we live our lives, changing transport options and changing our ways/mentalities.
- Air pollution as an example of schools engaging in politics
- Litter picking (not climate change education)
- Litter picking (pathway to action on climate change and sustainability)
- Recycling (pathway to action on climate change)
- Recycling (not climate change education)
- Urban environments and built environments

Other content suggestions shared by participants, including opportunities for multi-disciplinarity

- English and History
- Social Sciences and Humanities
- Politics and political systems: politics, political decision making (such as the climate negotiations, developing ideas around political action
- Economics, economic structures, investments/pensions, money management
- Philosophy (e.g. International Baccalaureate)
- Health and wellbeing
- Relationships (Nichola)
- Managing your emotions
- Critical thinking
- Problem solving
- Nurturing career options: if you care about CC, there are lots of career paths, you don't have to be a scientist